



Report No.: GZE160086-C

LM-79-08 Test Report

For

IKIO LED LIGHTING (Brand Name: IKIO LED LIGHTING)

8470 Allison Pointe Blvd, Suite 128
Indianapolis, IN 46250

Linear Retrofit Kits for 2x4 Luminaires

Model name(s): IK-MS04-002022-4-DY-XX-J

Representative (Tested) Model:

IK-MS04-002022-4-DY-30-J
IK-MS04-002022-4-DY-35-J
IK-MS04-002022-4-DY-40-J
IK-MS04-002022-4-DY-50-J

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

Test & Report By:

Jack Luo

Engineer: Jack Luo

Date: Aug.10,2016

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-MS04-002022-4-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 -277Vac, 50/60 Hz	
Nominal Power	80W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,5000K,	
LED Manufacturer	EVERLIGHT ELECTRONICS CO., LTD	
LED Model	67-21S Series (3000K)	
Sample Number	GZE160086-C1(3000K), C2(3500K), C3(4000K), C4(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-MS04-002022-4-DY-30-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160086-	120.0	60	0.6756	80.67	0.9950	6.09
C1	277.0	60	0.2952	78.47	0.9596	8.79
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	80	R9	1
Frequency (Hz)	60	R2	93	R10	84
CCT (K)	2883	R3	92	R11	75
Duv	-0.0024	R4	77	R12	72
Chromaticity (x, y)	x=0.4418 y=0.3995	R5	81	R13	84
Chromaticity (u', v')	u'=0.2557 v'=0.5203	R6	92	R14	97
Color Rendering Index (CRI)	80.9	R7	79	R15	72
R9	1	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)	8607.2	8576.0	$\geq 3000(-10\%)$	
Luminous Efficacy (lm/W)	106.70	109.29	Standard: $\geq 100(-3\%)$	Premium: $\geq 125(-3\%)$
Zonal lumens in the 0-60 °zone (%)	85.1	--	$\geq 75(-3)$	
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 (°)	98.0	--	--	
Center Beam Candle Power (cd)	3625	--	--	

Laboratory: Standard-Tech Co. Ltd Testing Center

NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

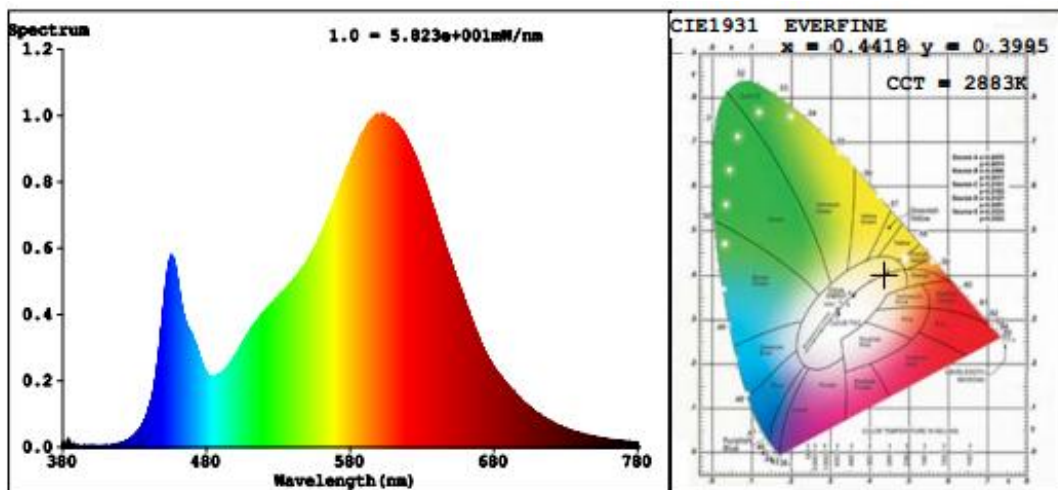
Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320

Fax: 8620-32290422

<http://www.standard-tech.com>

Spectral Power Distribution & Chromaticity Diagram

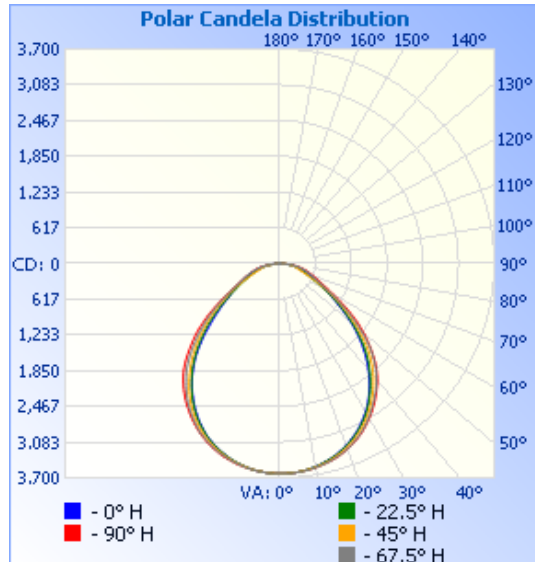


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	2,798.4	32.5%
0-40	4,515.4	52.5%
0-60	7,326.8	85.1%
60-90	1,268.3	14.7%
70-100	568.3	6.6%
90-120	4.9	0.1%
0-90	8,595.0	99.9%
90-180	10.9	0.1%
0-180	8,606.0	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	342.9	4.0%	90-100	1.1	0%
10-20	981.3	11.4%	100-110	1.7	0%
20-30	1,474.3	17.1%	110-120	2.0	0%
30-40	1,717.0	20.0%	120-130	1.7	0%
40-50	1,625.6	18.9%	130-140	1.5	0%
50-60	1,185.8	13.8%	140-150	1.2	0%
60-70	701.1	8.1%	150-160	0.9	0%
70-80	418.0	4.9%	160-170	0.6	0%
80-90	149.2	1.7%	170-180	0.2	0%

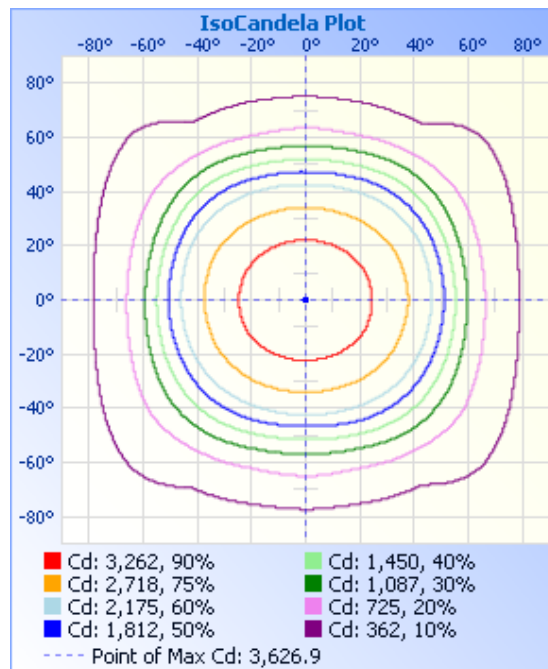
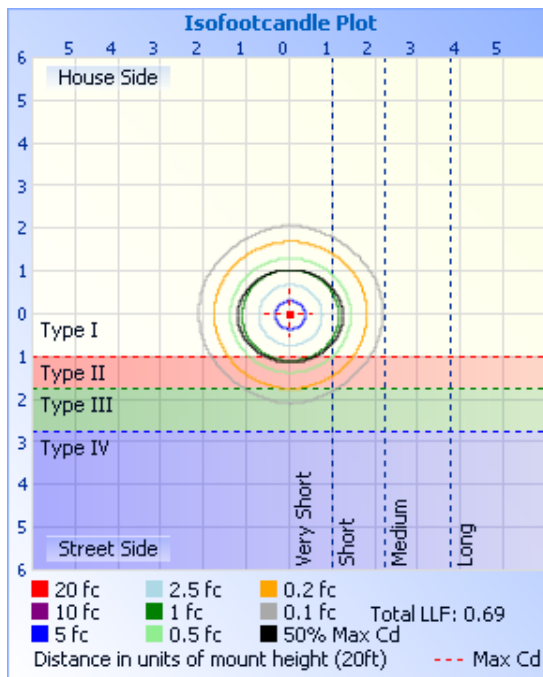
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	12.54 fc	36.5 ft	42.0 ft
34.0ft	3.14 fc	73.0 ft	83.9 ft
51.0ft	1.39 fc	109.5 ft	125.9 ft
68.0ft	0.78 fc	146.0 ft	167.9 ft
85.0ft	0.50 fc	182.5 ft	209.9 ft
102.0ft	0.35 fc	219.0 ft	251.8 ft

■ Vert. Spread: 94.1°
 ■ Horiz. Spread: 102.0°



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>

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	3625	3625	3625	3625	3625	3625	3625	3625	3625	3625	3625	3625	3625	3625	3625	3625	
5	3606	3607	3608	3609	3611	3610	3609	3614	3612	3608	3604	3607	3606	3606	3604	3607	
10	3560	3563	3556	3557	3557	3560	3565	3575	3573	3566	3558	3550	3549	3549	3551	3560	
15	3487	3486	3475	3469	3468	3472	3488	3508	3506	3497	3477	3461	3455	3456	3466	3480	
20	3382	3378	3358	3343	3339	3348	3375	3406	3407	3396	3361	3334	3320	3324	3347	3373	
25	3236	3230	3201	3177	3171	3185	3222	3259	3268	3253	3201	3159	3140	3150	3187	3232	
30	3053	3036	2995	2962	2956	2974	3021	3070	3083	3061	3000	2941	2911	2928	2979	3031	
35	2842	2812	2752	2694	2688	2712	2780	2843	2864	2818	2738	2667	2638	2653	2723	2795	
40	2593	2565	2484	2395	2372	2411	2507	2595	2615	2534	2421	2341	2316	2335	2411	2514	
45	2264	2255	2155	2057	2022	2067	2171	2279	2294	2190	2064	1962	1924	1971	2065	2169	
50	1880	1840	1740	1662	1632	1667	1760	1866	1907	1796	1685	1580	1511	1586	1683	1780	
55	1451	1379	1334	1269	1227	1270	1356	1414	1490	1413	1311	1204	1166	1199	1300	1385	
60	1034	976	948	903	915	906	966	1008	1070	1048	974	892	907	884	957	1022	
65	760	710	616	620	686	625	628	733	786	780	684	664	715	656	669	763	
70	584	554	415	457	517	461	422	573	605	607	475	500	554	494	462	595	
75	454	435	313	350	377	358	319	446	467	459	356	383	411	376	343	450	
80	320	306	251	251	279	257	256	319	331	312	268	265	288	260	260	304	
85	143	150	134	138	145	141	141	159	155	146	125	131	132	132	121	142	
90	1.44	1.16	1.28	1.72	2.07	2.57	1.52	1.53	1.10	0.79	0.74	1.48	1.49	1.43	0.80	1.22	
95	0.58	0.48	0.74	1.01	1.11	1.01	0.64	0.33	0.37	0.42	0.69	1.59	1.54	1.43	0.85	0.53	
100	1.58	1.59	1.64	1.32	1.06	1.27	1.48	0.95	1.91	1.96	1.06	1.64	1.54	1.53	1.17	1.22	
105	1.54	1.43	1.94	1.43	1.32	1.32	1.53	1.28	1.44	1.54	1.80	1.64	1.54	1.43	2.02	1.55	
110	2.59	2.85	2.69	1.43	1.43	1.48	1.80	2.12	2.66	2.44	2.06	1.38	1.37	1.32	2.12	2.72	
115	3.18	3.12	2.80	1.48	1.48	1.54	2.23	2.50	2.86	2.44	2.22	1.00	1.16	0.90	2.12	2.55	
120	3.23	3.18	2.64	1.01	1.01	1.11	2.17	2.71	2.76	2.44	2.17	0.85	0.85	0.64	2.07	2.39	
125	3.18	3.18	2.59	0.90	0.95	1.17	2.17	2.98	2.70	2.28	2.17	0.85	0.90	0.64	1.80	2.23	
130	3.07	2.81	2.38	0.90	0.95	1.06	2.17	2.55	2.54	2.44	2.12	1.07	1.22	1.17	1.64	2.13	
135	2.91	2.54	2.01	1.22	1.17	1.27	2.12	2.50	2.70	2.38	2.01	1.75	1.48	1.70	1.59	2.07	
140	2.75	2.59	1.59	1.43	1.27	1.48	1.59	2.39	2.70	2.38	1.47	1.90	1.69	1.80	1.16	2.07	
145	2.70	2.22	0.95	1.53	1.32	1.54	1.01	2.18	2.65	2.27	1.27	2.17	1.96	2.02	1.44	1.91	
150	2.34	1.59	1.16	1.59	1.43	1.69	1.16	1.70	2.33	2.06	1.74	2.22	2.23	2.28	2.12	1.49	
155	1.91	1.38	1.37	1.75	1.64	2.01	1.33	1.33	2.28	2.17	1.69	2.22	2.38	2.38	2.44	1.86	
160	2.17	1.38	1.53	2.06	1.59	2.12	1.48	1.38	2.33	2.22	1.69	2.22	2.70	2.44	2.39	1.97	
165	2.12	1.38	1.53	2.12	2.01	2.12	1.64	1.38	2.33	2.22	1.69	2.22	2.65	2.54	2.33	2.07	
170	2.12	1.38	1.85	2.12	2.49	2.38	2.12	1.59	2.33	2.23	1.69	2.17	2.65	2.54	2.38	2.08	
175	2.28	1.38	2.06	2.17	2.44	2.49	2.12	1.65	2.12	1.96	1.43	2.01	2.28	2.33	2.28	1.91	
180	1.81	1.43	2.11	2.17	2.54	2.60	1.91	1.33	2.01	1.96	1.43	1.90	2.17	2.38	2.28	1.97	

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>

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-MS04-002022-4-DY-35-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160086-	120.0	60	0.6726	80.24	0.9941	6.45
C2	277.0	60	0.2973	78.93	0.9583	8.60
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method in Lithonia

2GT8 lensed 2x4:

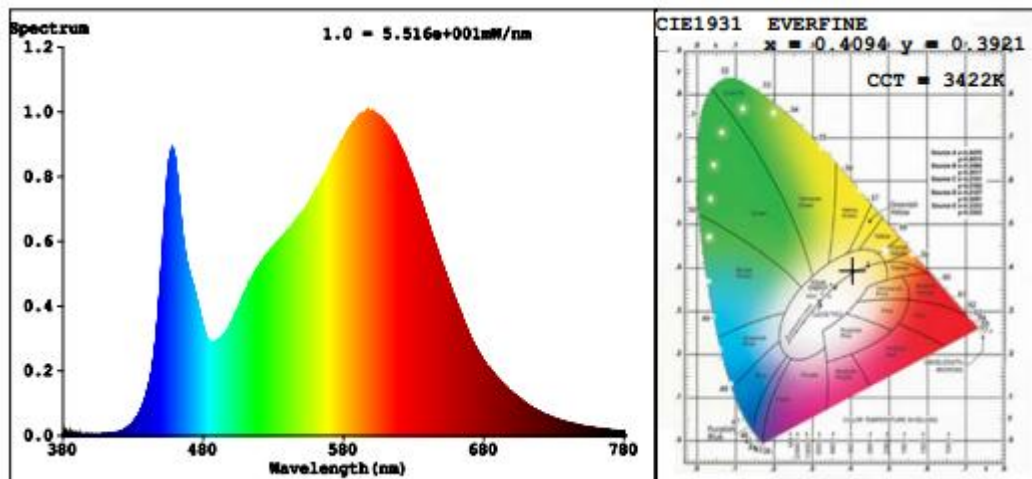
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	7
Frequency (Hz)	60	R2	93	R10	83
CCT (K)	3422	R3	94	R11	76
Duv	-0.0003	R4	78	R12	64
Chromaticity (x, y)	x=0.4094 y=0.3921	R5	81	R13	85
Chromaticity (u', v')	u'=0.2378 v'=0.5125	R6	90	R14	98
Color Rendering Index (CRI)	82.5	R7	82	R15	75
R9	7	R8	60	--	--

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)	8726	8730	>= 3000(-10%)	
Luminous Efficacy (lm/W)	108.75	110.60	Standard: >= 100(-3%)	Premium: >= 125(-3%)

Spectral Power Distribution & Chromaticity Diagram



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>

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-MS04-002022-4-DY-40-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160086-C3	120.0	60	0.6756	80.64	0.9947	6.74
	277.0	60	0.2977	78.88	0.9566	8.52
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	74
CCT (K)	3982	R3	95	R11	76
Duv	0.0017	R4	79	R12	56
Chromaticity (x, y)	x=0.3825 y=0.3817	R5	79	R13	83
Chromaticity (u', v')	u'=0.2245 v'=0.5040	R6	84	R14	98
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)	8937	8794	>= 3000(-10%)	
Luminous Efficacy (lm/W)	110.83	111.49	Standard: >= 100(-3%)	Premium: >= 125(-3%)

Laboratory: Standard-Tech Co. Ltd Testing Center

NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

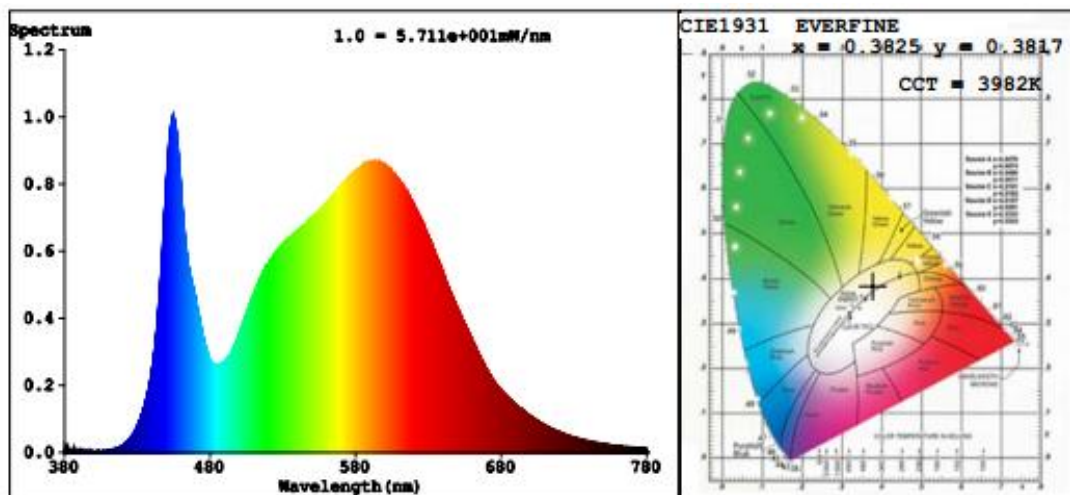
Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320

Fax: 8620-32290422

<http://www.standard-tech.com>

Spectral Power Distribution & Chromaticity Diagram



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>

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-MS04-002022-4-DY-50-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160086-C4	120.0	60	0.6731	80.37	0.9950	6.26
	277.0	60	0.2974	78.76	0.9559	10.58
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method in Lithonia

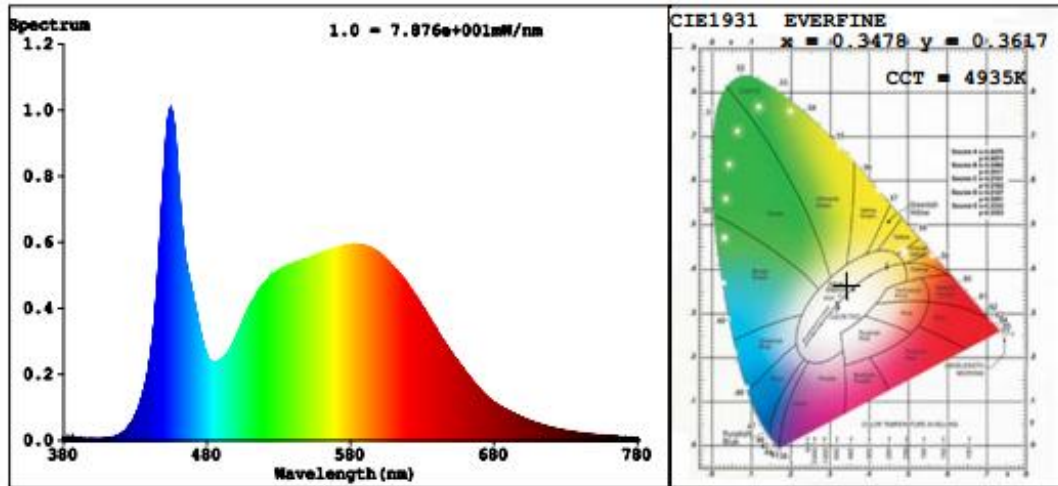
2GT8 lensed 2x4:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	3
Frequency (Hz)	60	R2	89	R10	72
CCT (K)	4935	R3	94	R11	76
Duv	0.0039	R4	78	R12	50
Chromaticity (x, y)	x=0.3478 y=0.3617	R5	79	R13	83
Chromaticity (u', v')	u'=0.2093 v'=0.4899	R6	83	R14	97
Color Rendering Index (CRI)	81.7	R7	87	R15	74
R9	3	R8	65	--	--

Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	9095	8976	>= 3000(-10%)	
Luminous Efficacy (lm/W)	113.16	113.97	Standard: >= 100(-3%)	Premium: >= 125(-3%)

Spectral Power Distribution & Chromaticity Diagram



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>

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 *******