

**LM-79-08 Test Report**

For

**ATG ELECTRONICS CORP****(Brand Name: N/A)**

10700 7th Street Rancho Cucamonga, CA 91730

**1x4 Luminaires for Ambient Lighting of Interior  
Commercial Spaces**

Model name(s): FPEL14-30W-ZZ

Remark: The suffix of the model name "ZZ" stands for different color  
temperature as below: 30=3000K, 35=3500K, 40=4000K,  
45=4500K, 50=5000K.

Representative (Tested) Model: FPEL14-30W-30  
FPEL14-30W-50

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

Test &amp; Report By:

*Garman Mo*

Engineer: Garman Mo

Date: Mar.29,2017

Review By:

*Tommy Liang*

Manager: Tommy Liang

Remark: This is a multiple listed report, the Project Number of the original report is GZE170352-H-A.

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

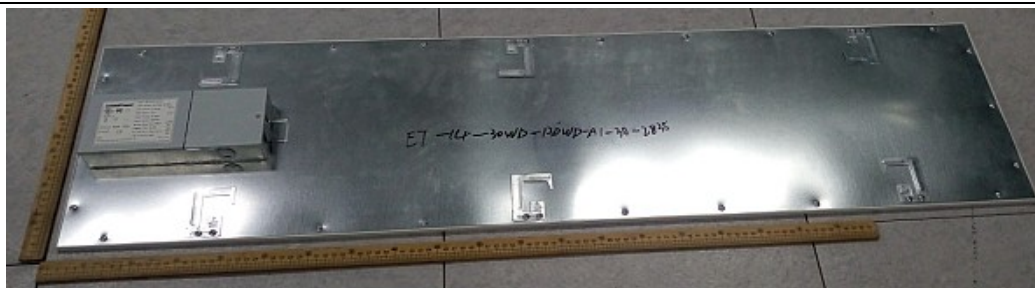
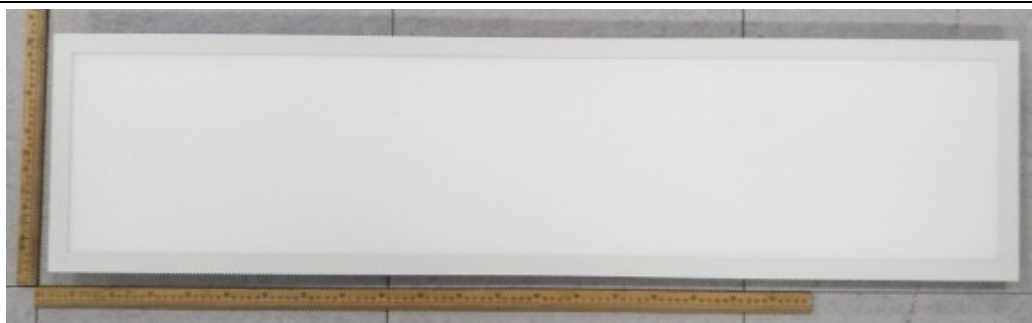
Tel: 8620-3229 0320

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**1.1 Product Information:**

Organization Name	ATG ELECTRONICS CORP	
Brand Name	N/A	
Model Number	FPEL14-30W-ZZ	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	1x4 Luminaires for Ambient Lighting of Interior Commercial Spaces	
Rated Voltage / Frequency	100 -277Vac, 50/60 Hz	
Nominal Power	30W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,4500K,5000K	
LED Manufacturer	EVERLIGHT ELECTRONICS CO., LTD	
LED Model	67-21S Series (3000K)	
Sample Number	GZE170352-H-A1(3000K),A2(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	Mar.26,2017
Date of Test	Mar.27,2017
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)*

Test date	2017-03-27	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	FPEL14-30W-30		

**Electrical Measurement:**

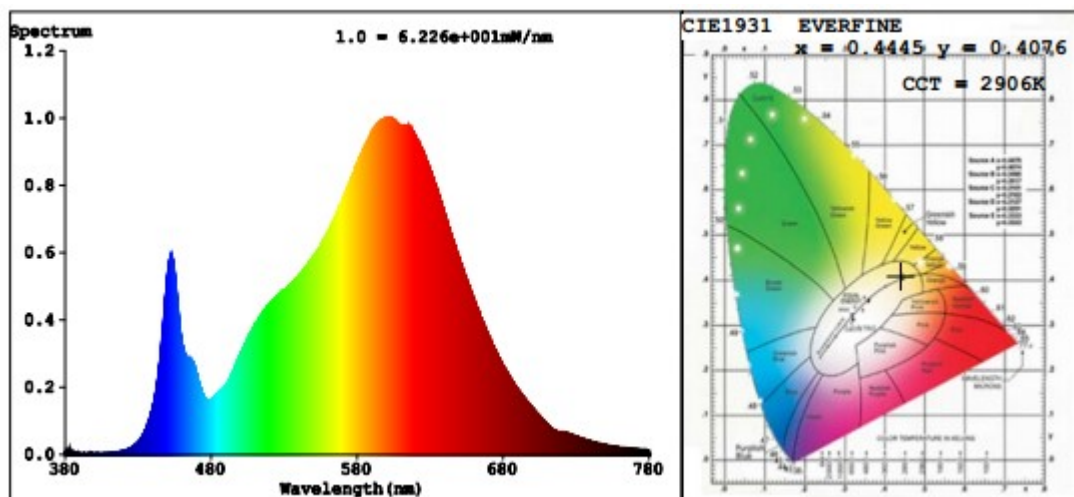
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170352-H-A1	120.0	60	0.2507	29.72	0.9880	11.15
	277.0	60	0.1184	29.31	0.8935	14.10
DLC Pass Criteria					$\geq 0.9(-3\%)$	$\leq 20(+5)$

**Chromaticity Measurement - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	5
Frequency (Hz)	60	R2	91	R10	80
CCT (K)	2906	R3	96	R11	79
Duv	0.0004	R4	80	R12	69
Chromaticity (x, y)	x=0.4445 y=0.4076	R5	81	R13	83
Chromaticity (u', v')	u'=0.2539 v'=0.5239	R6	89	R14	99
Color Rendering Index (CRI)	82.2	R7	82	R15	73
R9	5	R8	58	--	--

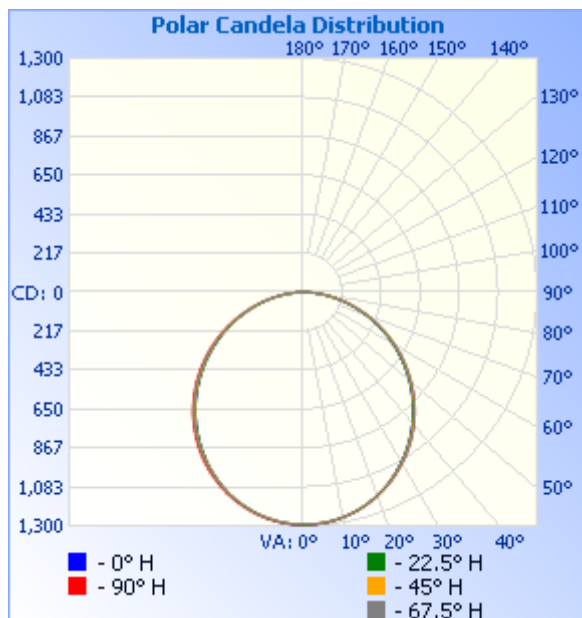
**Photometric Measurement – Goniophotometer Method:**

Parameter	Result		DLC V4.1 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	3737.2	3709.4	$\geq 1500 (-10\%)$	
Luminous Efficacy (lm/W)	125.75	126.56	Standard: $\geq 100(-3\%)$	Premium: $\geq 125(-3\%)$
Zonal lumens in the 0-60° zone (%)	77.7	--	$\geq 75(-3)$	
SC: 0-180° (if applicable)	1.26	--	1.0-2.0( $\pm 0.1$ )	
SC: 90-270° (if applicable)	1.24	--	1.0-2.0( $\pm 0.1$ )	
Beam Angle (°)	112.8	--	--	
Center Beam Candle Power (cd)	1294	--	--	

**Spectral Power Distribution & Chromaticity Diagram**

**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,002.5	26.8%
0-40	1,641.0	43.9%
0-60	2,905.1	77.7%
60-90	831.0	22.2%
70-100	365.0	9.8%
90-120	0.1	0%
0-90	3,736.1	100%
90-180	0.7	0%
0-180	3,736.9	100%

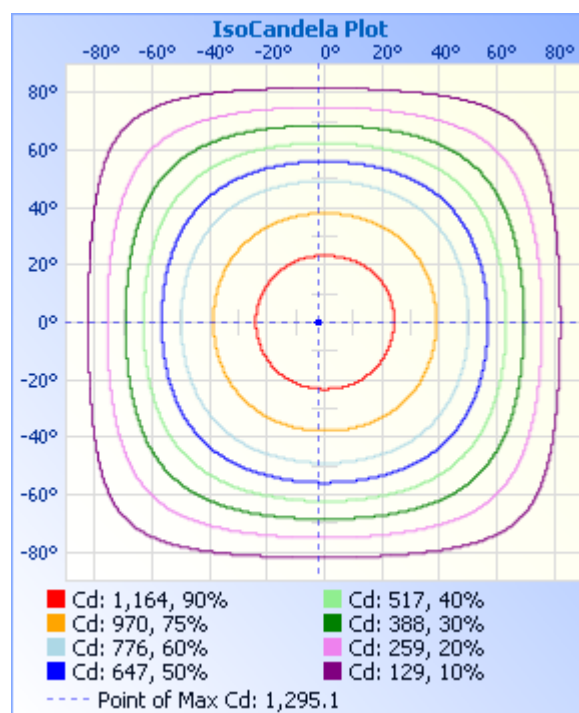
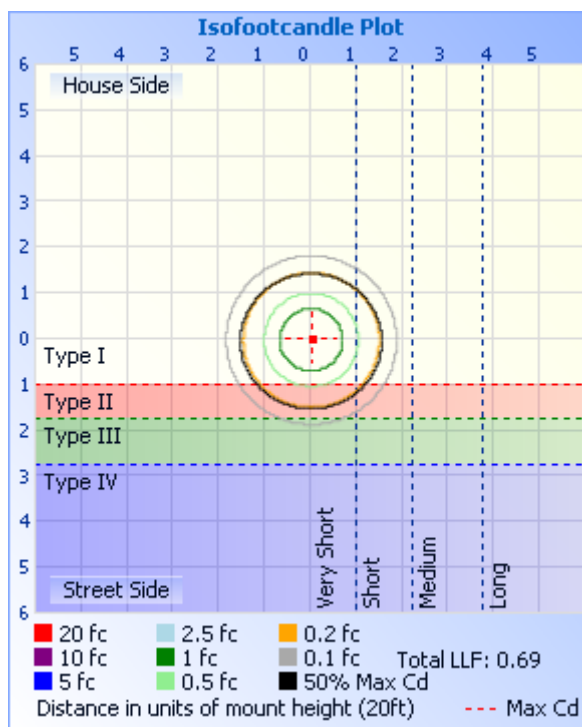
Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	122.3	3.3%	90-100	0.0	0%
10-20	350.1	9.4%	100-110	0.0	0%
20-30	530.1	14.2%	110-120	0.0	0%
30-40	638.5	17.1%	120-130	0.1	0%
40-50	662.7	17.7%	130-140	0.1	0%
50-60	601.4	16.1%	140-150	0.1	0%
60-70	466.0	12.5%	150-160	0.2	0%
70-80	281.4	7.5%	160-170	0.1	0%
80-90	83.6	2.2%	170-180	0.1	0%

**Photometric Data**


**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	4.48 fc	50.3 ft	52.0 ft
34.0ft	1.12 fc	100.6 ft	104.0 ft
51.0ft	0.50 fc	150.8 ft	156.0 ft
68.0ft	0.28 fc	201.1 ft	208.0 ft
85.0ft	0.18 fc	251.4 ft	260.0 ft
102.0ft	0.12 fc	301.7 ft	312.0 ft

■ Vert. Spread: 111.9°  
■ Horiz. Spread: 113.6°



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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	1295	1294	1294	1294	1293	1292	1291	1291	1295	1294	1294	1294	1293	1292	1291	1291	
5	1289	1289	1289	1289	1289	1287	1287	1287	1290	1288	1287	1287	1286	1285	1284	1285	
10	1271	1272	1272	1271	1271	1271	1270	1271	1273	1271	1268	1268	1267	1266	1266	1267	
15	1243	1244	1244	1242	1242	1242	1243	1243	1245	1242	1238	1237	1236	1235	1236	1237	
20	1203	1205	1204	1202	1202	1203	1204	1206	1207	1202	1198	1195	1194	1193	1194	1198	
25	1153	1155	1154	1152	1152	1153	1155	1157	1159	1152	1147	1142	1141	1141	1143	1147	
30	1094	1096	1095	1091	1092	1094	1096	1099	1100	1093	1086	1080	1079	1079	1082	1087	
35	1025	1027	1025	1022	1023	1025	1028	1033	1033	1025	1016	1009	1007	1008	1012	1018	
40	948	950	948	945	946	948	952	958	957	948	938	930	928	930	934	941	
45	864	866	864	861	862	864	869	875	874	864	853	844	842	844	849	857	
50	773	775	773	770	771	774	780	786	784	774	762	753	751	753	758	766	
55	677	678	677	674	676	679	685	690	689	679	667	656	655	656	662	670	
60	577	578	576	575	577	580	586	591	590	579	567	557	555	556	562	570	
65	474	474	473	472	474	478	484	489	487	477	466	455	453	454	460	467	
70	370	370	369	368	370	373	381	385	383	375	364	354	352	351	358	364	
75	266	267	266	265	267	271	278	281	281	274	263	255	252	252	256	262	
80	162	167	167	166	168	172	178	181	182	176	167	160	157	156	159	163	
85	70.0	73.6	73.8	73.8	75.3	78.5	83.4	85.9	87.1	82.7	76.2	70.8	68.0	66.7	67.6	70.9	
90	0.00	0.02	0.06	0.13	0.23	0.20	0.11	0.04	0.00	0.00	0.00	0.00	0.26	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	0.47	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	0.47	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	0.05	0.51	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	0.05	0.10	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	0.21	0.00	0.00	0.10	0.00	
125	0.00	0.00	0.10	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.00	0.37	0.16	0.00	
130	0.00	0.00	0.10	0.43	0.00	0.30	0.00	0.00	0.00	0.00	0.05	0.53	0.00	0.53	0.24	0.00	
135	0.00	0.00	0.10	0.46	0.00	0.37	0.00	0.00	0.00	0.05	0.10	0.60	0.00	0.55	0.31	0.10	
140	0.00	0.00	0.10	0.49	0.00	0.41	0.00	0.00	0.00	0.10	0.10	0.65	0.00	0.57	0.24	0.21	
145	0.00	0.00	0.10	0.52	0.00	0.41	0.00	0.00	0.05	0.10	0.21	0.69	0.00	0.50	0.27	0.38	
150	0.00	0.00	0.31	0.55	0.00	0.41	0.10	0.00	0.05	0.10	0.31	0.74	0.16	0.41	0.89	0.46	
155	0.00	0.00	0.50	0.57	0.00	0.41	0.31	0.16	0.05	0.14	0.39	0.78	0.21	0.32	0.86	0.52	
160	0.00	0.00	0.58	0.60	0.00	0.42	0.55	0.21	0.05	0.19	0.44	0.82	0.36	0.22	0.84	0.68	
165	0.00	0.16	0.69	0.62	0.00	0.49	0.63	0.26	0.10	0.29	0.53	0.87	0.54	0.26	0.79	0.89	
170	0.00	0.47	0.83	0.58	0.11	0.55	0.94	0.78	0.23	0.42	0.54	0.90	0.53	0.30	0.72	1.26	
175	0.21	0.49	1.09	0.54	0.26	0.57	1.20	0.54	0.33	0.49	0.53	0.92	0.42	0.23	0.62	1.25	
180	0.31	0.47	1.09	0.42	0.16	0.57	1.20	0.42	0.31	0.26	0.52	1.04	0.42	0.21	0.57	1.20	

## 2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2017-03-27	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	FPEL14-30W-50		

### Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170352-H-A2	120.0	60	0.2534	29.95	0.9851	11.62
	277.0	60	0.1200	29.56	0.8892	14.58
DLC Pass Criteria					$\geq 0.9(-3\%)$	$\leq 20(+5)$

### Chromaticity Measurement - Sphere-Spectroradiometer Method:

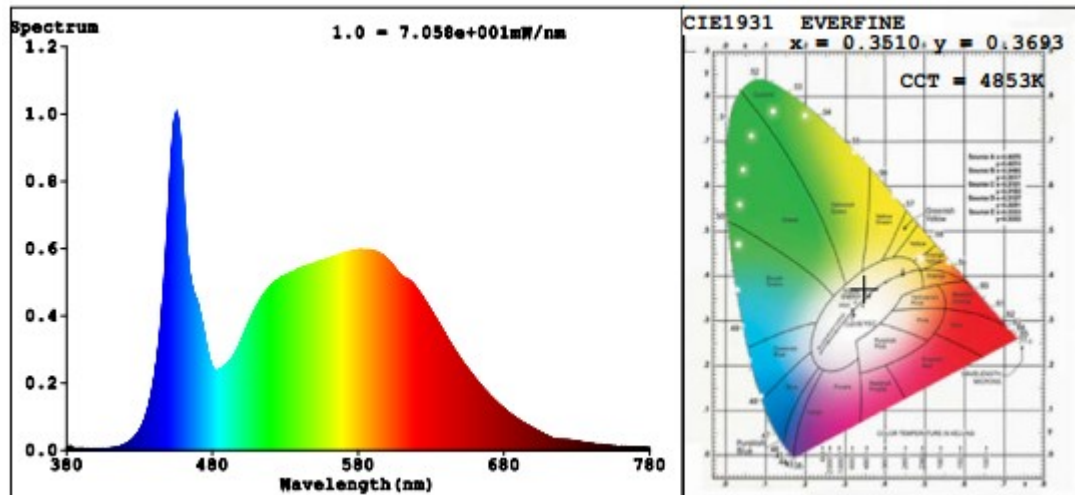
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	79	R9	3
Frequency (Hz)	60	R2	89	R10	73
CCT (K)	4853	R3	95	R11	76
Duv	0.0063	R4	78	R12	50
Chromaticity (x, y)	x=0.3510 y=0.3693	R5	78	R13	82
Chromaticity (u', v')	u'=0.2087 v'=0.4939	R6	83	R14	97
Color Rendering Index (CRI)	81.8	R7	87	R15	73
R9	3	R8	65	--	--

### Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.1 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	3862	3832	$\geq 1500(-10\%)$	
Luminous Efficacy (lm/W)	128.96	129.62	Standard: $\geq 100(-3\%)$	Premium: $\geq 125(-3\%)$



**Spectral Power Distribution & Chromaticity Diagram**



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### 2.3 Performance Assessment:

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
FPEL14-30W-30	3000K	3737.2	29.72	125.75
FPEL14-30W-35	3500K	3768 <sup>*1</sup>	29.84 <sup>*2</sup>	126.27 <sup>*3</sup>
FPEL14-30W-40	4000K	3800 <sup>*1</sup>	29.84 <sup>*2</sup>	127.35 <sup>*3</sup>
FPEL14-30W-45	4500K	3831 <sup>*1</sup>	29.84 <sup>*2</sup>	128.38 <sup>*3</sup>
FPEL14-30W-50	5000K	3862	29.95	128.96

\*1: This value is calculated and the calculation formula is as below:

$$3768 = (3862 - 3737.2) / 4 + 3737.2$$

$$3800 = (3862 - 3737.2) / 4 + 3768$$

$$3831 = (3862 - 3737.2) / 4 + 3800$$

\*2: This value is calculated and the calculation formula is as below:

$$29.84 = (29.72 + 29.95) / 2$$

\*3: This value is calculated and the calculation formula is as below:

$$126.27 = 3768 / 29.84$$

$$127.35 = 3800 / 29.84$$

$$128.38 = 3831 / 29.84$$

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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 \*\*\*\*\***