



Report No.: GZE1706081-H-D

LM-79-08 Test Report

For

ATG ELECTRONICS CORP

(Brand Name: N/A)

10700 7th Street Rancho Cucamonga, CA 91730

2x4 Luminaires for Ambient Lighting of Interior Commercial Spaces

Model name(s): FPEL24-40W-ZZ

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

Representative (Tested) Model: FPEL24-40W-30
FPEL24-40W-50

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

Test & Report By:

Jack Luo

Engineer: Jack Luo
Date: Jul.20,2016

Review By:

Tommy Liang

Manager: Tommy Liang

Remark: This is a multiple listed report, the Project Number of the original report is GZE160475-R.

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

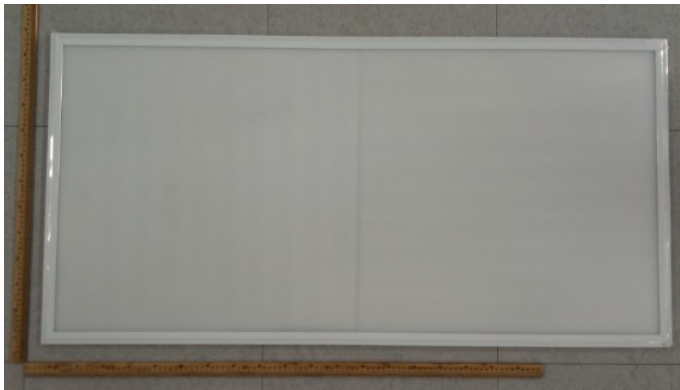
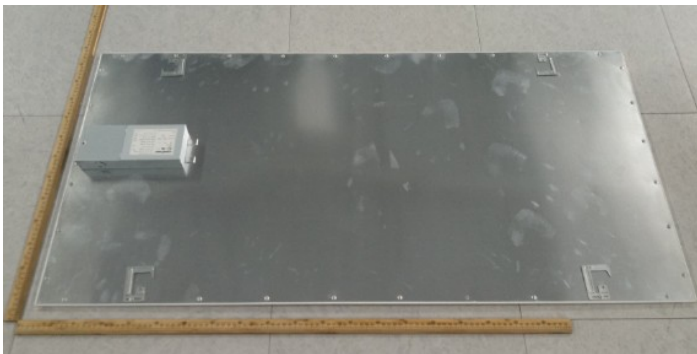
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1.1 Product Information:

Organization Name	ATG ELECTRONICS CORP	
Brand Name	N/A	
Model Number	FPEL24-40W-ZZ	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	2x4 Luminaires for Ambient Lighting of Interior Commercial Spaces	
Rated Voltage / Frequency	100 -277Vac, 50/60 Hz	
Nominal Power	40W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,5000K	
LED Manufacturer	EVERLIGHT ELECTRONICS CO.,LTD	
LED Model	67-21S Series	
Sample Number	GZE160475-R1(3000K), R2(5000K)	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s
Photo		
		
		

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1.2 Test Specifications:

Date of Receipt	Jul.15, 2016
Date of Test	Jul.17, 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	2016-07-17	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	FPEL24-40W-30		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160475-	120.0	60	0.3430	40.89	0.9935	5.78
R1	277.0	60	0.1643	40.76	0.8958	13.68
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	5
Frequency (Hz)	60	R2	89	R10	75
CCT (K)	3010	R3	97	R11	80
Duv	0.0027	R4	80	R12	67
Chromaticity (x, y)	x=0.4403 y=0.4122	R5	79	R13	81
Chromaticity (u', v')	u'=0.2493 v'=0.5250	R6	86	R14	99
Color Rendering Index (CRI)	81.8	R7	84	R15	72
R9	5	R8	59	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	5336.1	5305.7	$\geq 3000(-10\%)$	
Luminous Efficacy (lm/W)	130.50	130.17	Standard: $\geq 100(-3\%)$	Premium: $\geq 125(-3\%)$
Zonal lumens in the 0-60° zone (%)	78.5	--	$\geq 75(-3)$	
SC: 0-180° (if applicable)	1.27	--	1.0-2.0(± 0.1)	
SC: 90-270° (if applicable)	1.25	--	1.0-2.0(± 0.1)	
Beam Angle (°)	113.2	--	--	
Center Beam Candle Power (cd)	1852	--	--	

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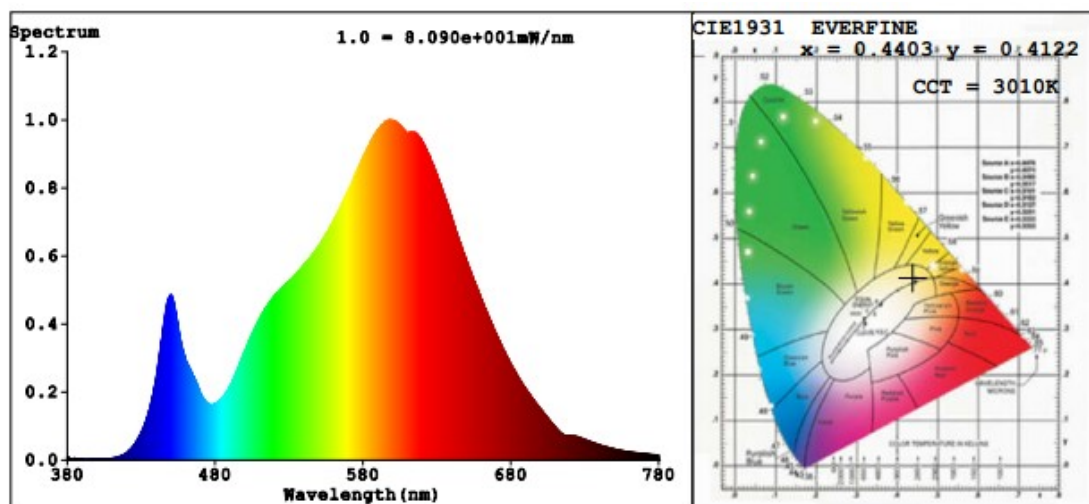
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Spectral Power Distribution & Chromaticity Diagram

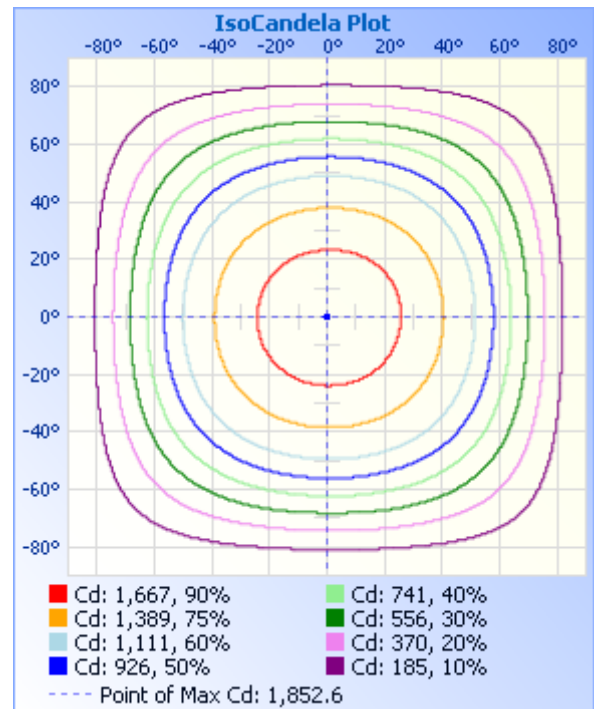
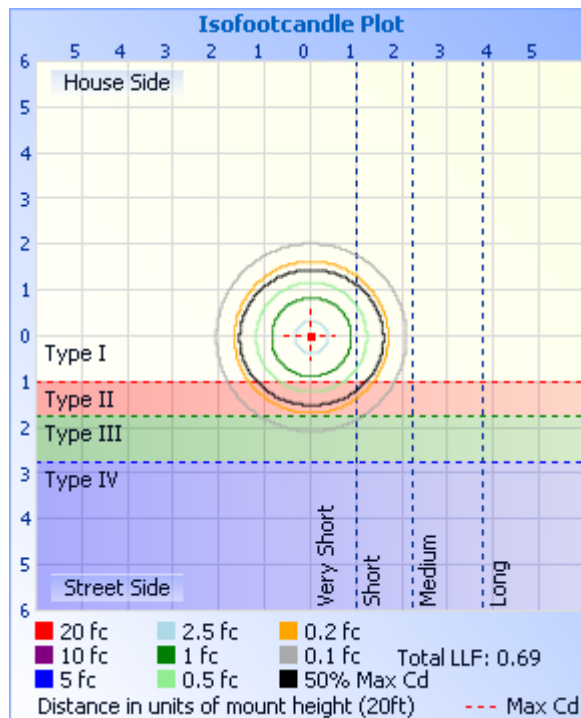
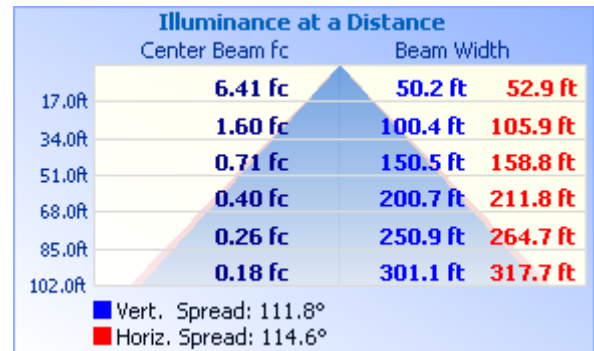
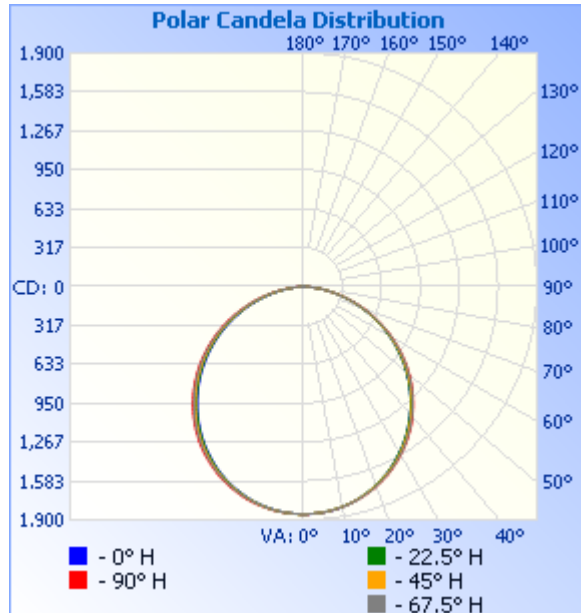


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,441.2	27%
0-40	2,363.5	44.3%
0-60	4,189.5	78.5%
60-90	1,143.8	21.4%
70-100	483.5	9.1%
90-120	1.6	0%
0-90	5,333.3	100%
90-180	2.3	0%
0-180	5,335.6	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	175.2	3.3%	90-100	1.1	0%
10-20	502.6	9.4%	100-110	0.3	0%
20-30	763.3	14.3%	110-120	0.3	0%
30-40	922.3	17.3%	120-130	0.2	0%
40-50	958.7	18.0%	130-140	0.1	0%
50-60	867.3	16.3%	140-150	0.1	0%
60-70	661.3	12.4%	150-160	0.1	0%
70-80	380.0	7.1%	160-170	0.1	0%
80-90	102.5	1.9%	170-180	0.0	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	1852	1852	1852	1852	1852	1852	1852	1852	1852	1852	1852	1852	1852	1852	1852	1852	
5	1845	1846	1847	1845	1844	1843	1843	1844	1843	1842	1842	1842	1843	1844	1844	1844	
10	1823	1825	1824	1822	1821	1818	1819	1820	1820	1819	1817	1816	1817	1818	1820	1821	
15	1789	1791	1786	1781	1779	1777	1778	1782	1782	1780	1777	1775	1775	1777	1782	1784	
20	1738	1739	1733	1726	1721	1719	1723	1729	1730	1726	1720	1717	1718	1720	1726	1732	
25	1672	1673	1664	1654	1648	1647	1653	1660	1664	1660	1650	1645	1644	1648	1657	1665	
30	1593	1592	1581	1569	1561	1559	1568	1578	1581	1577	1565	1557	1556	1561	1573	1583	
35	1499	1497	1483	1469	1461	1459	1471	1482	1486	1481	1467	1457	1456	1461	1476	1488	
40	1393	1390	1374	1358	1350	1349	1360	1374	1378	1372	1356	1345	1343	1350	1366	1382	
45	1273	1269	1252	1237	1228	1227	1239	1253	1258	1251	1233	1222	1220	1228	1244	1261	
50	1143	1138	1122	1105	1097	1097	1108	1122	1127	1118	1101	1090	1087	1096	1113	1131	
55	1003	997	981	965	957	957	967	980	985	975	958	948	946	955	972	991	
60	853	848	833	819	811	810	820	831	835	825	809	799	798	807	824	842	
65	697	693	679	667	659	658	666	675	678	669	655	646	645	654	670	688	
70	539	535	523	512	505	504	510	517	520	511	498	491	491	499	514	531	
75	380	376	369	360	354	353	357	360	364	356	346	340	340	348	361	375	
80	226	226	224	218	212	211	213	214	217	212	204	200	200	207	217	227	
85	96.9	97.8	95.6	92.1	87.4	86.1	87.0	87.4	89.4	85.5	80.4	77.3	77.6	83.0	88.9	96.5	
90	0.32	0.45	0.84	1.50	2.05	1.36	1.00	0.76	0.12	0.00	15.1	0.58	13.3	6.42	0.12	0.00	
95	0.00	0.00	0.18	0.40	0.41	0.25	0.13	0.00	0.00	0.00	2.67	0.56	5.41	1.69	0.19	0.00	
100	0.00	0.00	0.18	0.35	0.37	0.31	0.08	0.00	0.00	0.00	0.36	0.52	0.76	1.17	0.29	0.00	
105	0.00	0.00	0.18	0.43	0.41	0.33	0.24	0.00	0.10	0.11	0.40	0.49	0.54	0.64	0.28	0.12	
110	0.00	0.06	0.53	0.39	0.49	0.25	0.47	0.06	0.23	0.24	0.39	0.35	0.41	0.29	0.24	0.24	
115	0.18	0.41	0.52	0.35	0.43	0.18	0.56	0.41	0.18	0.44	0.37	0.00	0.12	0.00	0.20	0.24	
120	0.33	0.49	0.50	0.06	0.33	0.00	0.50	0.50	0.18	0.47	0.35	0.00	0.00	0.00	0.12	0.23	
125	0.45	0.45	0.48	0.06	0.20	0.00	0.44	0.51	0.18	0.32	0.23	0.00	0.17	0.00	0.00	0.23	
130	0.41	0.42	0.35	0.06	0.20	0.00	0.41	0.53	0.18	0.29	0.23	0.06	0.22	0.00	0.00	0.23	
135	0.34	0.37	0.20	0.06	0.19	0.00	0.23	0.41	0.18	0.25	0.06	0.18	0.29	0.06	0.00	0.21	
140	0.39	0.23	0.06	0.06	0.19	0.00	0.06	0.33	0.18	0.26	0.00	0.23	0.37	0.23	0.00	0.19	
145	0.35	0.17	0.00	0.06	0.19	0.00	0.00	0.29	0.18	0.27	0.00	0.35	0.45	0.30	0.12	0.23	
150	0.25	0.10	0.00	0.06	0.18	0.00	0.00	0.12	0.18	0.29	0.00	0.47	0.59	0.45	0.21	0.06	
155	0.18	0.06	0.00	0.23	0.18	0.00	0.00	0.00	0.18	0.31	0.00	0.49	0.60	0.64	0.35	0.12	
160	0.16	0.12	0.00	0.26	0.29	0.00	0.00	0.00	0.27	0.34	0.00	0.50	0.61	0.60	0.48	0.35	
165	0.14	0.00	0.00	0.29	0.41	0.18	0.00	0.00	0.34	0.34	0.00	0.52	0.62	0.56	0.52	0.41	
170	0.12	0.00	0.06	0.44	0.50	0.47	0.06	0.00	0.39	0.35	0.00	0.49	0.64	0.57	0.56	0.46	
175	0.35	0.00	0.18	0.46	0.48	0.47	0.27	0.00	0.27	0.35	0.00	0.35	0.56	0.52	0.47	0.53	
180	0.35	0.00	0.18	0.47	0.47	0.47	0.35	0.18	0.18	0.35	0.00	0.18	0.47	0.47	0.47	0.29	

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2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-07-17	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	FPEL24-40W-50		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160475-	120.0	60	0.3408	40.63	0.9936	5.48
R2	277.0	60	0.1624	40.37	0.8973	13.85
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

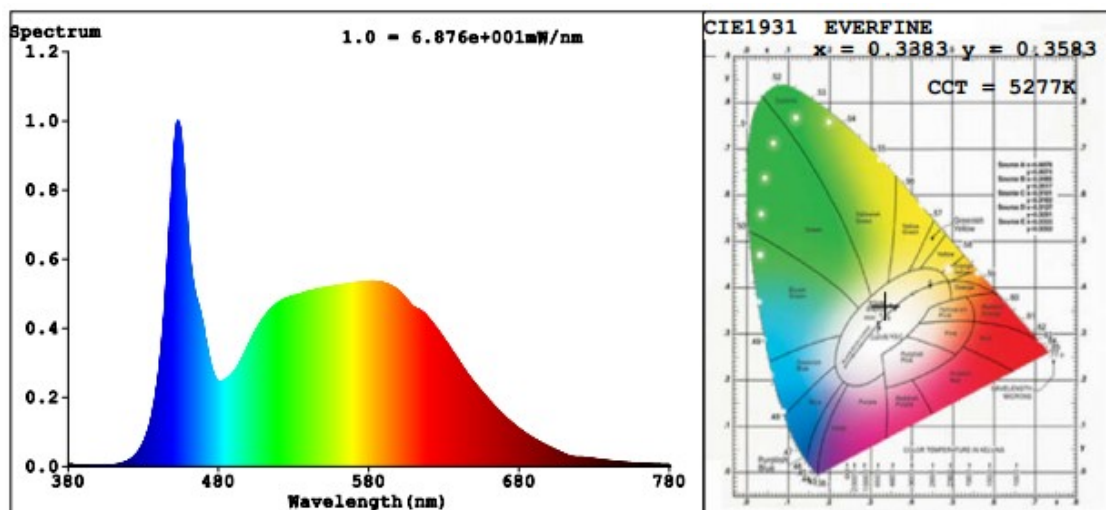
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	8
Frequency (Hz)	60	R2	89	R10	74
CCT (K)	5277	R3	94	R11	81
Duv	0.0061	R4	82	R12	59
Chromaticity (x, y)	x=0.3383 y=0.3583	R5	82	R13	84
Chromaticity (u', v')	u'=0.2043 v'=0.4869	R6	85	R14	97
Color Rendering Index (CRI)	83.5	R7	88	R15	75
R9	8	R8	67	--	--

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)	5403	5343	>=3000(-10%)	
Luminous Efficacy (lm/W)	132.98	132.35	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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