

IES LM-79-08

MEASUREMENT AND TEST REPORT

For

GREEN CREATIVE LTD

756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai, China

Test Model: LE209027DIM120VMD/ADR4BL

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang <i>George Yang</i>
Report Number:	RKSB190722004-10-2
Test Date:	2019-07-22 to 2019-07-23
Report Date:	2019-07-30
Reviewed By:	Ray Gao/EE Engineer <i>Ry Gao</i>
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan). No.248 Chenghu Road, Kunshan, Jiangsu province, China. Tel: +86-0512-86175000 Fax: +86-0512-88934268
Accreditation:	The IAS Accreditation Number TL-749.

1. Product Description

General Information:

A sample was received on 2019-07-22 and used for testing.

Model Tested: LE209027DIM120VMD/ADR4BL
 Manufacturer: GREEN CREATIVE LTD
 Brand Name: GREEN CREATIVE
 Product Designation: LED Recessed Downlight
 Burning TimeBefore Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120-277 VAC 60Hz
 Rated Power: 24W
 Nominal CCT: 2700K
 Nominal Lumen Output: 1650lm

2. Standards Used

- IES LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
- ANSI C82.77-10-2014: Harmonic Emission Limits – Related Power Quality Requirements for Lighting Equipment
- IES TM-30-18:IES Method for Evaluating Light Source Color Rendition

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Integrating Sphere	INVENTFINE	Dia 1.5m	JWWCV090112	2019-01-23	2020-01-22
Power Meter	INVENTFINE	WT500	GSJWQ20009	2019-04-23	2020-04-22
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2019-01-23	2020-01-22
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2019-04-23	2020-04-22
Standard Light Source	INVENTFINE	N/A	JWWCR020106	2018-12-24	2019-12-23
Thermal Meter	KEJIAN	TA298	N/A	2018-12-01	2019-11-30
DC Power Supply	INVENTFINE	WL3005	JWWCP020069	2019-04-23	2020-04-22
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	2019-04-23	2020-04-22
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	2019-04-23	2020-04-22
Power Meter	INVENTFINE	WT500	GSDSQ200007	2019-04-23	2020-04-22
Goniophotometer	INVENTFINE	GPM-1900	YWGCF120001	2019-01-24	2020-01-23
Wireless Weather Station	ZHONGXING	KG218	N/A	2018-12-01	2019-11-30
Standard Light Source	INVENTFINE	N/A	JWBYR040008	2019-03-08	2020-03-07

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

4. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with IES LM-79-08. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ during measurement. And relative humidity is less than 65%.

Integrating Sphere System

The system includes AC power source, digital power meter, DC power supply, Spectroradiometer, and integrating sphere. The integrating sphere system is calibrated by standard spectrum light source before measurement.

4π geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

The uncertainty of the light output (luminous flux) measurements is $U_{\text{rel}}=2.70\%$ ($k=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=27\text{K}$ ($k=2$), at the 95% confidence level. The uncertainty of the CRI is $U=2.7(k=2)$, at the 95% confidence level.

The uncertainty of power meter AC current $U_{\text{rel}}=0.27\%$ of rdg, AC Voltage $U_{\text{rel}}=0.26\%$ of rdg, Power $U_{\text{rel}}=0.41\%$ ($k=2$), at the 95% confidence level.

Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement.

Type C goniophotometer was used for measuring total luminous flux, luminous intensity distribution, and color spatial uniformity. The product was operated in its intended orientation in application and was recorded in this report. The vertical angle (γ) test intervals were set no more than 1 degree while data for 5 degree intervals is reported. The horizontal angle (C plane) test intervals were set no more than 22.5 degree.

The uncertainty of the luminous flux is $U_{\text{rel}}=2.6\%$ ($k=2$), at the 95% confidence level.

Fidelity Index and Gamut Index Calculation

The R_i , R_g was calculated according to IES TM-30-18 by using calculation tools. The calculation was based on the measured SPD from 380nm to 780nm with 1nm intervals. All the colors in this report is for reference only.

5. Test Result

[Integrating Sphere System]

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Downward**

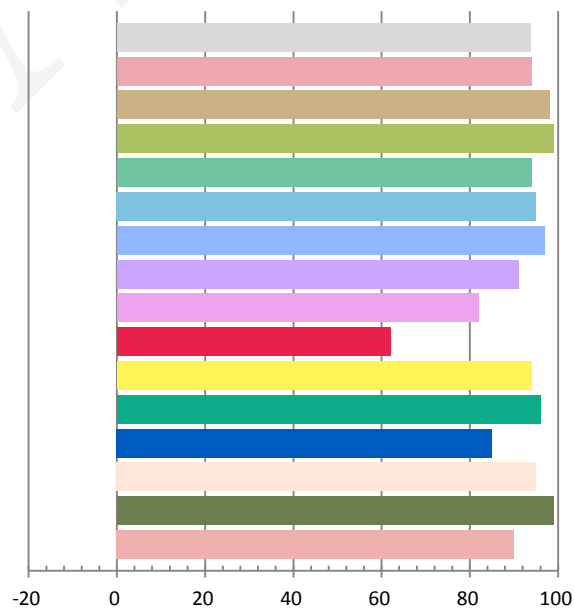
Photometric and Electrical Measurement Result

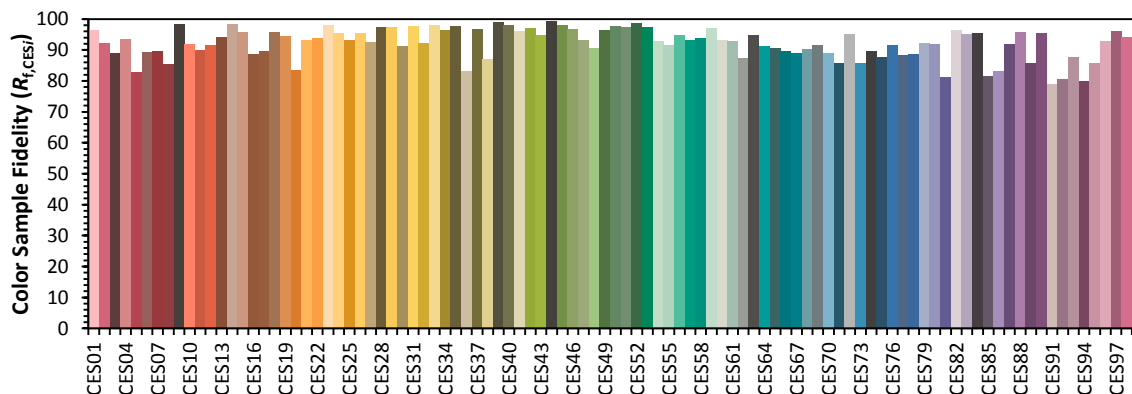
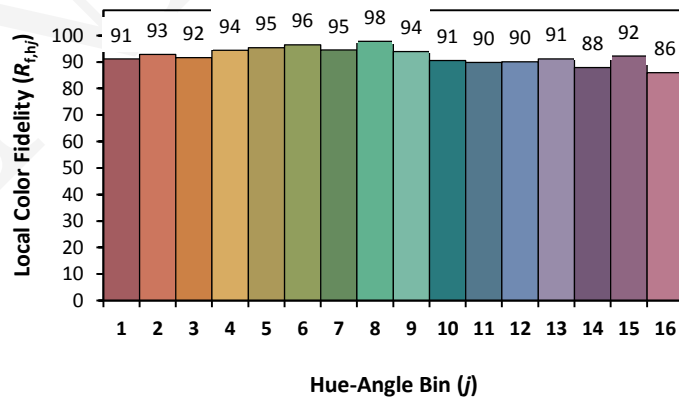
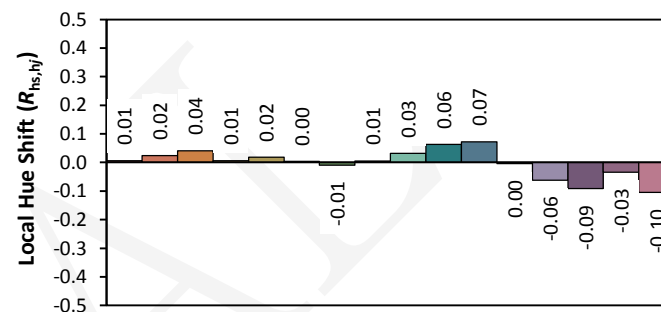
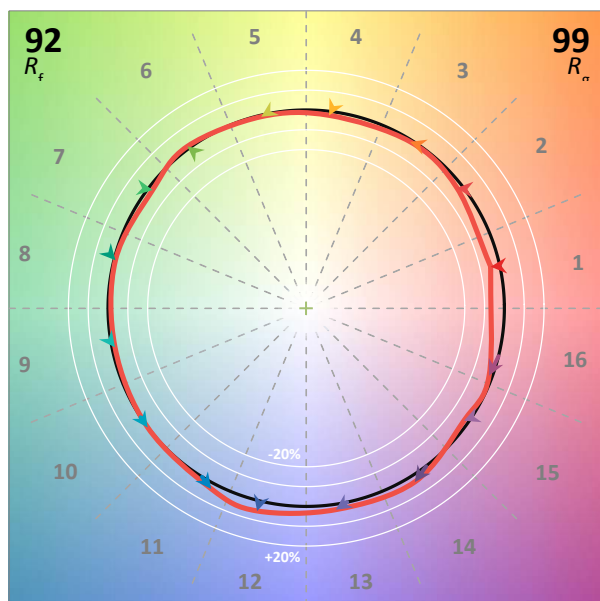
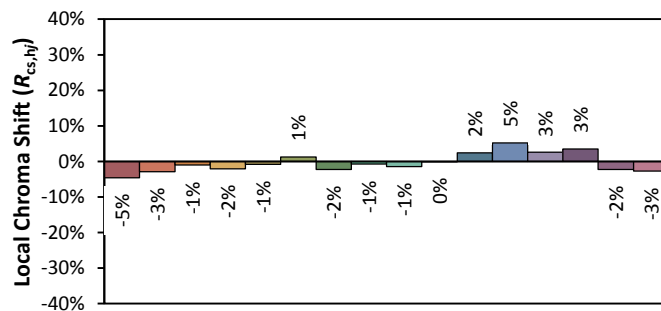
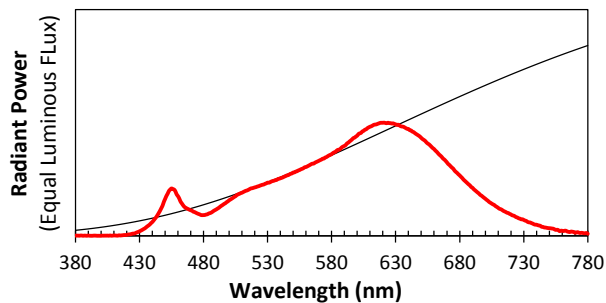
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.2064	24.36	0.9835	1736.86	71.3

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
6.144	2719	-0.00081	0.4569	0.4078	0.2619	0.5258

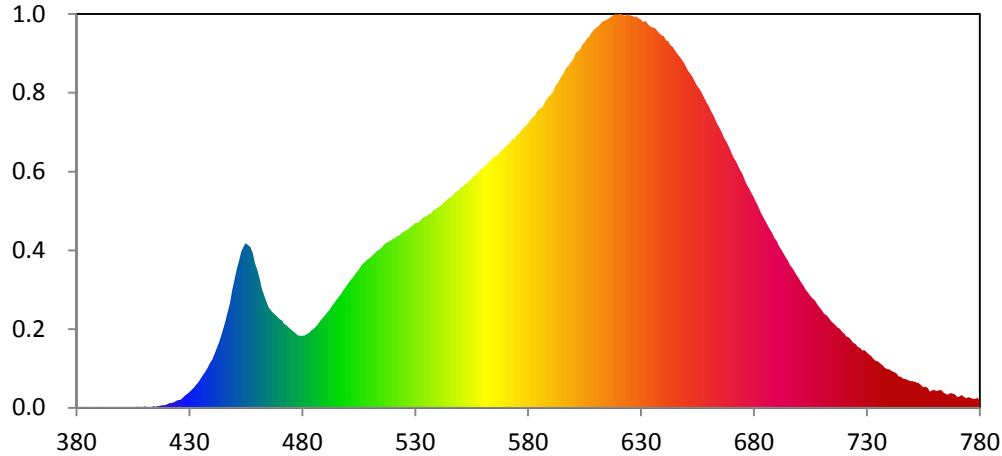
Color Rendering Index

Ra			
93.7			
R1	R2	R3	R4
94	98	99	94
R5	R6	R7	R8
95	97	91	82
R9	R10	R11	R12
62	94	96	85
R13	R14	R15	
95	99	90	





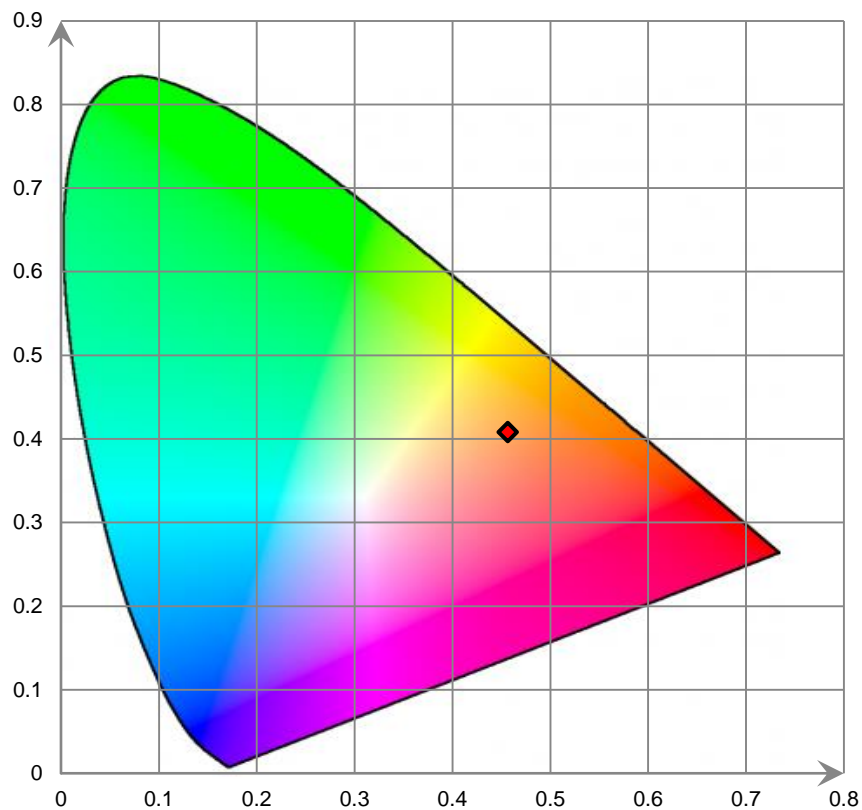
Relative Spectral Power Distribution



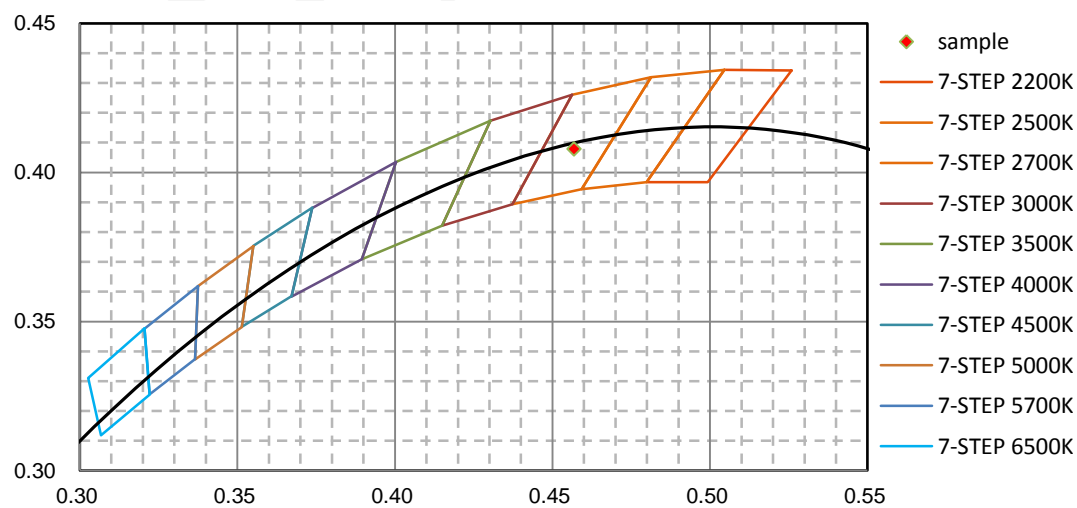
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	6.280E-02	421	4.167E-01	462	1.157E+01	503	1.281E+01	544	2.012E+01
381	5.470E-02	422	4.576E-01	463	1.094E+01	504	1.311E+01	545	2.034E+01
382	5.880E-02	423	5.206E-01	464	1.031E+01	505	1.336E+01	546	2.044E+01
383	2.200E-02	424	6.493E-01	465	9.774E+00	506	1.374E+01	547	2.068E+01
384	8.840E-02	425	7.446E-01	466	9.465E+00	507	1.397E+01	548	2.091E+01
385	6.970E-02	426	7.662E-01	467	9.218E+00	508	1.416E+01	549	2.103E+01
386	7.500E-03	427	9.580E-01	468	9.004E+00	509	1.438E+01	550	2.134E+01
387	6.570E-02	428	1.158E+00	469	8.789E+00	510	1.452E+01	551	2.138E+01
388	4.070E-02	429	1.323E+00	470	8.593E+00	511	1.476E+01	552	2.165E+01
389	1.120E-02	430	1.516E+00	471	8.446E+00	512	1.497E+01	553	2.177E+01
390	8.920E-02	431	1.736E+00	472	8.123E+00	513	1.517E+01	554	2.203E+01
391	1.760E-02	432	1.963E+00	473	7.996E+00	514	1.530E+01	555	2.218E+01
392	7.000E-03	433	2.234E+00	474	7.768E+00	515	1.551E+01	556	2.244E+01
393	1.400E-03	434	2.467E+00	475	7.553E+00	516	1.576E+01	557	2.259E+01
394	4.120E-02	435	2.805E+00	476	7.376E+00	517	1.598E+01	558	2.281E+01
395	6.620E-02	436	3.162E+00	477	7.217E+00	518	1.604E+01	559	2.312E+01
396	3.890E-02	437	3.470E+00	478	7.005E+00	519	1.618E+01	560	2.320E+01
397	3.400E-03	438	3.823E+00	479	6.964E+00	520	1.632E+01	561	2.341E+01
398	6.900E-03	439	4.270E+00	480	6.977E+00	521	1.643E+01	562	2.365E+01
399	2.000E-04	440	4.661E+00	481	7.018E+00	522	1.661E+01	563	2.388E+01
400	0.000E+00	441	5.183E+00	482	7.164E+00	523	1.672E+01	564	2.414E+01
401	5.050E-02	442	5.736E+00	483	7.249E+00	524	1.691E+01	565	2.432E+01
402	4.010E-02	443	6.282E+00	484	7.508E+00	525	1.706E+01	566	2.435E+01
403	5.170E-02	444	6.941E+00	485	7.642E+00	526	1.721E+01	567	2.466E+01
404	4.550E-02	445	7.685E+00	486	7.827E+00	527	1.729E+01	568	2.487E+01
405	6.800E-02	446	8.447E+00	487	8.113E+00	528	1.753E+01	569	2.507E+01
406	1.710E-02	447	9.313E+00	488	8.425E+00	529	1.769E+01	570	2.529E+01
407	1.056E-01	448	1.019E+01	489	8.669E+00	530	1.792E+01	571	2.552E+01
408	1.650E-02	449	1.144E+01	490	8.915E+00	531	1.791E+01	572	2.570E+01
409	6.300E-02	450	1.244E+01	491	9.196E+00	532	1.807E+01	573	2.601E+01
410	1.100E-01	451	1.345E+01	492	9.466E+00	533	1.832E+01	574	2.604E+01
411	1.026E-01	452	1.423E+01	493	9.828E+00	534	1.847E+01	575	2.640E+01
412	6.130E-02	453	1.514E+01	494	1.013E+01	535	1.857E+01	576	2.656E+01
413	4.920E-02	454	1.560E+01	495	1.042E+01	536	1.876E+01	577	2.686E+01
414	1.654E-01	455	1.597E+01	496	1.073E+01	537	1.883E+01	578	2.711E+01
415	1.016E-01	456	1.574E+01	497	1.098E+01	538	1.913E+01	579	2.731E+01
416	1.473E-01	457	1.559E+01	498	1.134E+01	539	1.923E+01	580	2.753E+01
417	1.867E-01	458	1.500E+01	499	1.161E+01	540	1.939E+01	581	2.788E+01
418	2.510E-01	459	1.396E+01	500	1.197E+01	541	1.954E+01	582	2.814E+01
419	2.561E-01	460	1.337E+01	501	1.224E+01	542	1.972E+01	583	2.833E+01
420	3.054E-01	461	1.260E+01	502	1.252E+01	543	1.994E+01	584	2.874E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.900E+01	626	3.799E+01	667	2.605E+01	708	9.999E+00	749	2.603E+00
586	2.905E+01	627	3.785E+01	668	2.572E+01	709	9.744E+00	750	2.562E+00
587	2.941E+01	628	3.792E+01	669	2.527E+01	710	9.443E+00	751	2.526E+00
588	2.984E+01	629	3.772E+01	670	2.478E+01	711	9.119E+00	752	2.445E+00
589	3.010E+01	630	3.760E+01	671	2.422E+01	712	8.976E+00	753	2.396E+00
590	3.032E+01	631	3.736E+01	672	2.387E+01	713	8.753E+00	754	2.192E+00
591	3.061E+01	632	3.749E+01	673	2.340E+01	714	8.434E+00	755	1.990E+00
592	3.114E+01	633	3.721E+01	674	2.298E+01	715	8.224E+00	756	2.031E+00
593	3.140E+01	634	3.695E+01	675	2.261E+01	716	8.012E+00	757	1.929E+00
594	3.180E+01	635	3.685E+01	676	2.200E+01	717	7.770E+00	758	1.544E+00
595	3.214E+01	636	3.678E+01	677	2.155E+01	718	7.662E+00	759	1.717E+00
596	3.252E+01	637	3.655E+01	678	2.120E+01	719	7.388E+00	760	1.692E+00
597	3.295E+01	638	3.630E+01	679	2.074E+01	720	7.201E+00	761	1.593E+00
598	3.313E+01	639	3.607E+01	680	2.037E+01	721	6.906E+00	762	1.712E+00
599	3.349E+01	640	3.602E+01	681	1.990E+01	722	6.811E+00	763	1.688E+00
600	3.379E+01	641	3.559E+01	682	1.948E+01	723	6.598E+00	764	1.450E+00
601	3.433E+01	642	3.553E+01	683	1.894E+01	724	6.303E+00	765	1.336E+00
602	3.455E+01	643	3.513E+01	684	1.855E+01	725	6.166E+00	766	1.258E+00
603	3.473E+01	644	3.497E+01	685	1.814E+01	726	5.902E+00	767	1.430E+00
604	3.520E+01	645	3.462E+01	686	1.774E+01	727	5.787E+00	768	1.362E+00
605	3.540E+01	646	3.432E+01	687	1.733E+01	728	5.548E+00	769	1.287E+00
606	3.577E+01	647	3.404E+01	688	1.698E+01	729	5.566E+00	770	1.041E+00
607	3.593E+01	648	3.376E+01	689	1.645E+01	730	5.352E+00	771	1.076E+00
608	3.632E+01	649	3.344E+01	690	1.619E+01	731	5.140E+00	772	1.224E+00
609	3.657E+01	650	3.300E+01	691	1.570E+01	732	4.999E+00	773	1.063E+00
610	3.678E+01	651	3.262E+01	692	1.534E+01	733	4.697E+00	774	9.369E-01
611	3.694E+01	652	3.233E+01	693	1.497E+01	734	4.537E+00	775	1.012E+00
612	3.718E+01	653	3.201E+01	694	1.460E+01	735	4.484E+00	776	9.518E-01
613	3.743E+01	654	3.151E+01	695	1.426E+01	736	4.282E+00	777	8.677E-01
614	3.751E+01	655	3.113E+01	696	1.380E+01	737	4.113E+00	778	8.528E-01
615	3.759E+01	656	3.085E+01	697	1.354E+01	738	3.884E+00	779	9.432E-01
616	3.776E+01	657	3.045E+01	698	1.317E+01	739	3.755E+00	780	6.807E-01
617	3.792E+01	658	2.999E+01	699	1.283E+01	740	3.732E+00		
618	3.808E+01	659	2.957E+01	700	1.250E+01	741	3.574E+00		
619	3.811E+01	660	2.924E+01	701	1.213E+01	742	3.462E+00		
620	3.811E+01	661	2.875E+01	702	1.182E+01	743	3.359E+00		
621	3.815E+01	662	2.836E+01	703	1.141E+01	744	3.035E+00		
622	3.804E+01	663	2.787E+01	704	1.115E+01	745	2.997E+00		
623	3.797E+01	664	2.739E+01	705	1.085E+01	746	2.806E+00		
624	3.813E+01	665	2.702E+01	706	1.060E+01	747	2.777E+00		
625	3.800E+01	666	2.658E+01	707	1.038E+01	748	2.683E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **2.0hour**

Test orientation: **Downward**

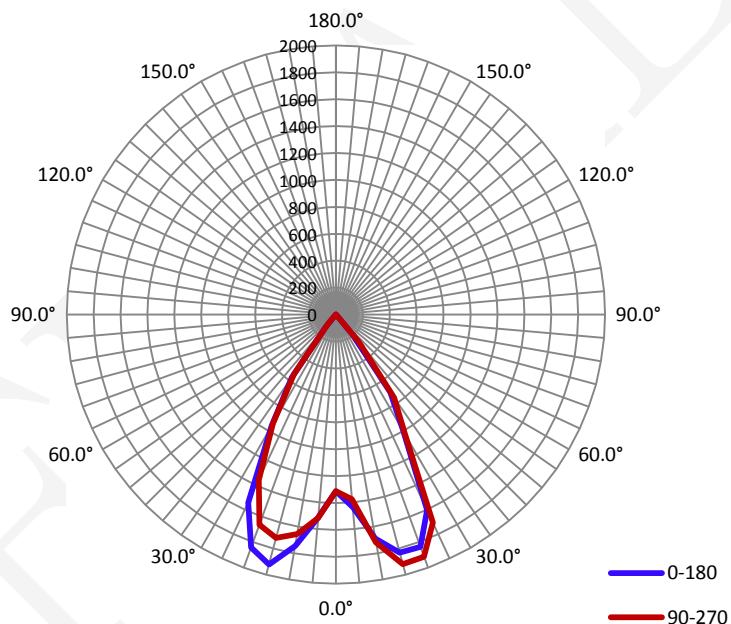
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2120	24.39	0.9600

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1744.3	71.57	1955.1	1.14	1.15

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	60.6	61.1	60.9	60.2	60.7
Field Angle(10% I_{max}):	79.3	79.6	80.3	79.3	79.6

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1313	1313	1313	1313	1313	1313	1313	1313
5.0°	1437	1419	1405	1388	1378	1394	1427	1459
10.0°	1691	1716	1721	1697	1718	1759	1775	1761
15.0°	1830	1858	1869	1890	1921	1939	1954	1950
20.0°	1837	1885	1920	1912	1915	1952	1955	1926
25.0°	1604	1665	1680	1695	1706	1699	1690	1660
30.0°	1002	1018	1029	1027	1027	1022	1000	996
35.0°	704	749	757	755	756	734	697	658
40.0°	198	215	237	263	268	246	213	187
45.0°	10	11	10	12	12	11	8	9
50.0°	3	3	3	3	3	3	3	3
55.0°	1	1	1	1	2	2	2	2
60.0°	0	0	0	0	1	0	0	0
65.0°	0	0	0	0	0	0	0	0
70.0°	0	0	0	0	0	0	0	0
75.0°	0	0	0	0	0	0	0	0
80.0°	0	0	0	0	0	0	0	0
85.0°	0	0	0	0	0	0	0	0
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	0	0	0	0	0	0
130.0°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	0	0	0	0	0	0	0	0
145.0°	0	0	0	0	0	0	0	0
150.0°	0	0	0	0	0	0	0	0
155.0°	0	0	0	0	0	0	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1313	1313	1313	1313	1313	1313	1313	1313
5.0°	1514	1539	1546	1530	1517	1493	1481	1474
10.0°	1744	1730	1706	1681	1657	1649	1657	1679
15.0°	1923	1869	1827	1763	1719	1739	1761	1791
20.0°	1841	1790	1728	1669	1663	1696	1717	1783
25.0°	1543	1482	1415	1374	1357	1398	1446	1515
30.0°	955	953	940	930	936	950	959	968
35.0°	572	531	506	519	541	576	599	623
40.0°	120	84	66	75	87	83	82	119
45.0°	7	6	7	7	7	7	8	7
50.0°	3	3	2	4	3	3	3	4
55.0°	2	1	1	2	1	0	0	1
60.0°	0	0	0	0	0	0	0	0
65.0°	0	0	0	0	0	0	0	0
70.0°	0	0	0	0	0	0	0	0
75.0°	0	0	0	0	0	0	0	0
80.0°	0	0	0	0	0	0	0	0
85.0°	0	0	0	0	0	0	0	0
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	0	0	0	0	0	0
130.0°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	0	0	0	0	0	0	0	0
145.0°	0	0	0	0	0	0	0	0
150.0°	0	0	0	0	0	0	0	0
155.0°	0	0	0	0	0	0	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	33.2	1.90
5-10	113.5	6.50
10-15	211.1	12.10
15-20	302.8	17.36
20-25	354.8	20.34
25-30	321.5	18.43
30-35	239.2	13.71
35-40	133.7	7.66
40-45	31.0	1.78
45-50	2.4	0.14
50-55	0.9	0.05
55-60	0.3	0.02
60-65	0.0	0.00
65-70	0.0	0.00
70-75	0.0	0.00
75-80	0.0	0.00
80-85	0.0	0.00
85-90	0.0	0.00
90-95	0.0	0.00
95-100	0.0	0.00
100-105	0.0	0.00
105-110	0.0	0.00
110-115	0.0	0.00
115-120	0.0	0.00
120-125	0.0	0.00
125-130	0.0	0.00
130-135	0.0	0.00
135-140	0.0	0.00
140-145	0.0	0.00
145-150	0.0	0.00
150-155	0.0	0.00
155-160	0.0	0.00
160-165	0.0	0.00
165-170	0.0	0.00
170-175	0.0	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	33.2	1.90
0-10	146.6	8.41
0-15	357.7	20.51
0-20	660.6	37.87
0-25	1015.3	58.21
0-30	1336.8	76.64
0-35	1576.0	90.35
0-40	1709.7	98.02
0-45	1740.7	99.79
0-50	1743.1	99.93
0-55	1744.0	99.98
0-60	1744.3	100.00
0-65	1744.3	100.00
0-70	1744.3	100.00
0-75	1744.3	100.00
0-80	1744.3	100.00
0-85	1744.3	100.00
0-90	1744.3	100.00
0-95	1744.3	100.00
0-100	1744.3	100.00
0-105	1744.3	100.00
0-110	1744.3	100.00
0-115	1744.3	100.00
0-120	1744.3	100.00
0-125	1744.3	100.00
0-130	1744.3	100.00
0-135	1744.3	100.00
0-140	1744.3	100.00
0-145	1744.3	100.00
0-150	1744.3	100.00
0-155	1744.3	100.00
0-160	1744.3	100.00
0-165	1744.3	100.00
0-170	1744.3	100.00
0-175	1744.3	100.00
0-180	1744.3	100.00

6. Product Photo



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