



# IES LM-79-08

## MEASUREMENT AND TEST REPORT

For

### GREEN CREATIVE LTD

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

**Test Model: 98HID/850/277V/EX39**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
<b>Test Engineer:</b>	Carl Du <i>Carl Du</i>
<b>Report Number:</b>	RKS161206007-10
<b>Test Date:</b>	2016-12-10
<b>Report Date:</b>	2016-12-12
<b>Reviewed By:</b>	Blake Zhang <i>Blake Zhang</i>
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Dongguan). Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China. Tel: +86-0769-86858888 Fax: +86-0769-86858588
<b>Test Facility:</b>	Test facility was located at Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China.
<b>Accreditation:</b>	The IAS Accreditation Number TL-460.

**Note:** The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan). This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

## 1. Product Description

### General Information:

One sample was received on 2016-12-06 and used for testing.

Model Tested: 98HID/850/277V/EX39  
 Manufacturer: GREEN CREATIVE LTD  
 Brand Name: GREEN CREATIVE  
 Product Designation: LED HID  
 Burning Time Before Test: 0hour(For New Products)

### Rated Values:

Rated Voltage/Frequency: 120-277 VAC 60Hz  
 Rated Power: 98W  
 Nominal CCT: 5000K  
 Nominal Lumen Output: 12800 lm  
 Nominal CRI: 80

## 2. Standards Used

- IES LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
- ANSI C82.77-2002: Harmonic Emission Limits – Related Power Quality Requirements for Lighting
- IES TM-30-15: IES Method for Evaluating Light Source Color Rendition (This method is not in IAS accreditation scope)

## 3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Integrating Sphere	SENSING	N/A	N/A	25°C	2016-03-10	2017-03-09
Power Meter	SENSING	UI2008	908735	10.0-600.0V	2016-03-04	2017-03-03
Spectral photometer	SENSING	SPR3000	s0902024	350nm~800nm	2016-03-10	2017-03-09
AC Power Supply	EVERFINE	APW-105N	970663	220V±10% 50Hz	2016-03-04	2017-03-03
Standard Light Source	EVERFINE	D204	G100283CA8351158	24V/100W	2016-08-26	2017-08-25
Thermal Meter	SENSING	N/A	N/A	25°C	2016-03-21	2017-03-20
DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	0~32V	2016-03-04	2017-03-03
AC Power Supply	EVERFINE	VPS1030 PWM	1012017	0-150V, 0-300V	2016-03-04	2017-03-03
DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2016-03-04	2017-03-03
Power Meter	YOKOGAWA	WT-210	91KB35700	15/30/60/150/300/600 V	2016-03-04	2017-03-03
Goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	1600mm,3000W/10A	2016-03-10	2017-03-09
Wireless Remote Sensor	N/A	433MHz	N/A	0°C~50°C;- 20°C~60°C	2016-03-21	2017-03-20
Standard Light Source	EVERFINE	D908	1012003	N/A	2016-09-07	2017-09-06

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) 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.

$4\pi$  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  $U=2.3\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=23\text{K}$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the CRI is  $U=2.3(K=2)$ , at the 95% confidence level.

The uncertainty of power meter AC current  $U=0.19\%$  of rdg, AC Voltage  $U=0.15\%$  of rdg, Power  $U=0.20\%$  ( $K=2$ ), 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 ( $\gamma$ ) 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 intensity is  $U=1.6\%$  ( $K=2$ ), at the 95% confidence level.

##### **Fidelity Index and Gamut Index Calculation**

The  $R_i$ ,  $R_g$  was calculated according to IES TM-30-15 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: **0.5hour**

Test orientation: **Downward**

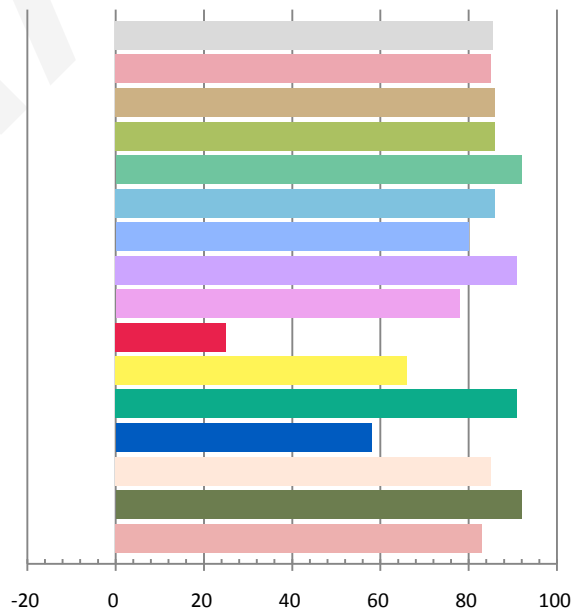
### Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.8348	100.04	0.9988	13767.3	137.61

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
43.088	5048	0.00028	0.3438	0.3511	0.2107	0.4843

### Color Rendering Index

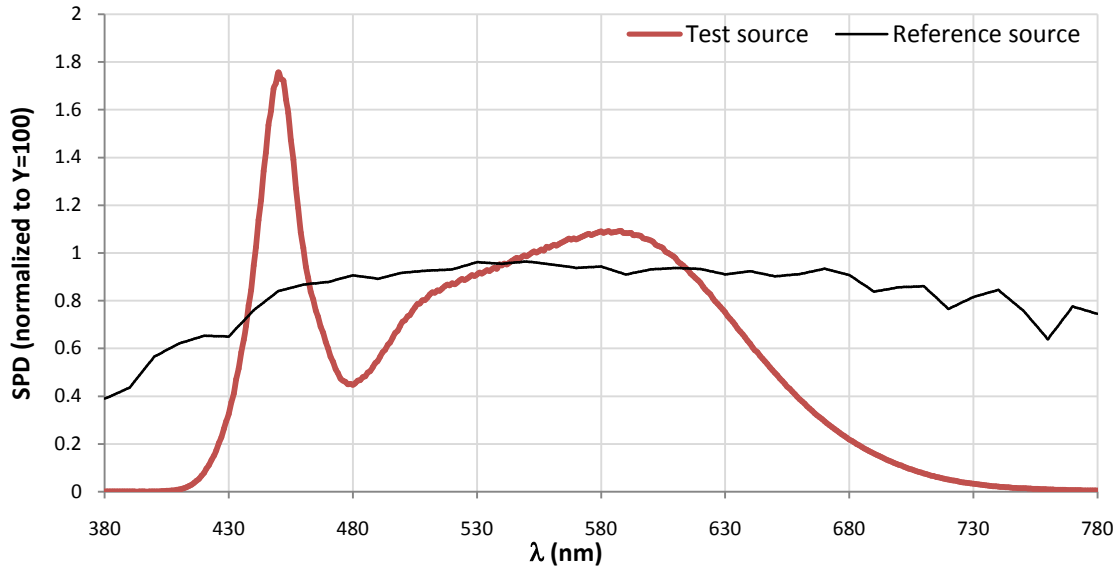
Ra			
<b>85.6</b>			
R1	R2	R3	R4
85	86	86	92
R5	R6	R7	R8
86	80	91	78
R9	R10	R11	R12
25	66	91	58
R13	R14	R15	
85	92	83	



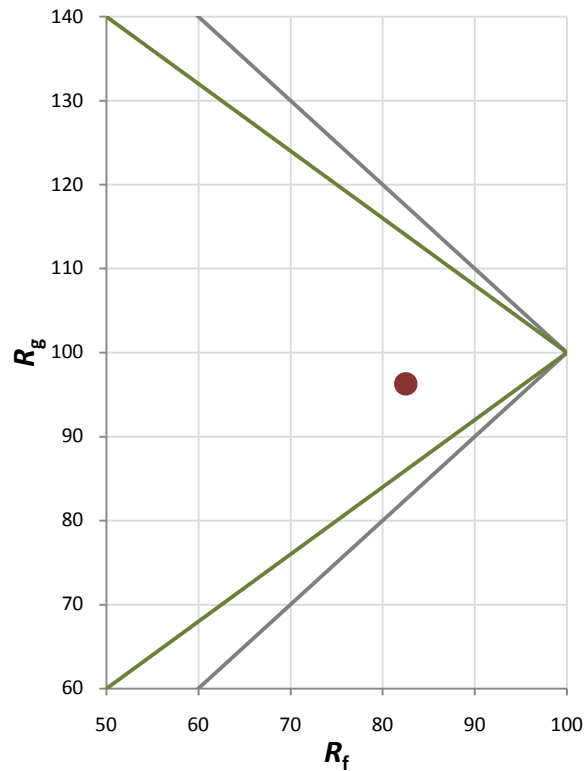
Fidelity Index and Gamut Index

Fidelity Index $R_f$	82
Gamut Index $R_g$	96

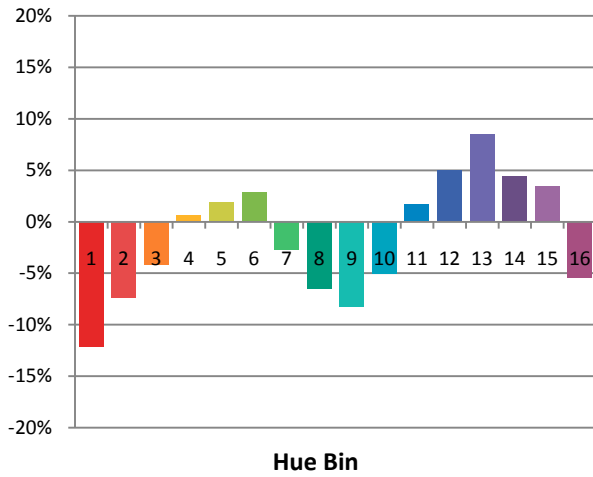
Spectral Power Distribution Comparison



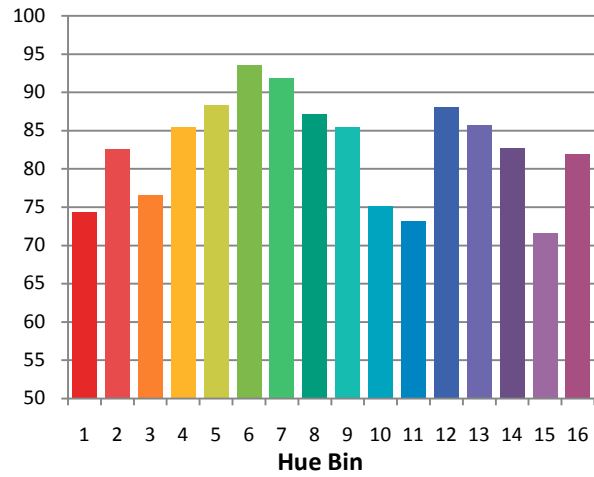
Plot of  $R_g$  versus  $R_f$



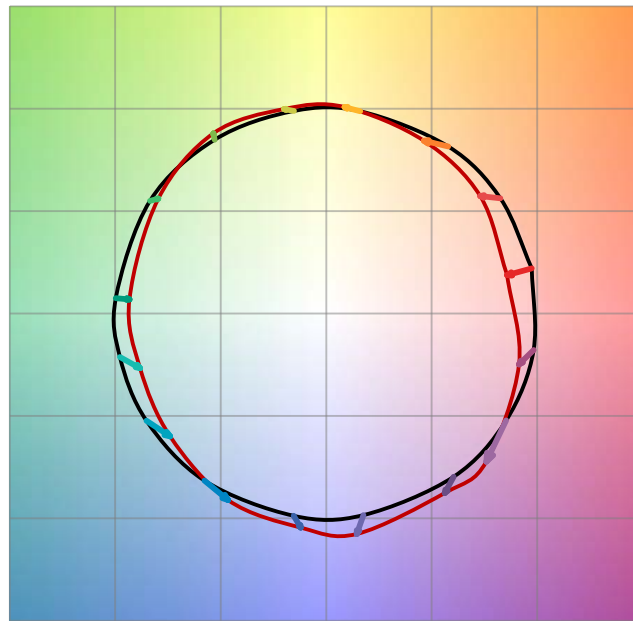
Chroma Shift by Hue



$R_f$  by Hue

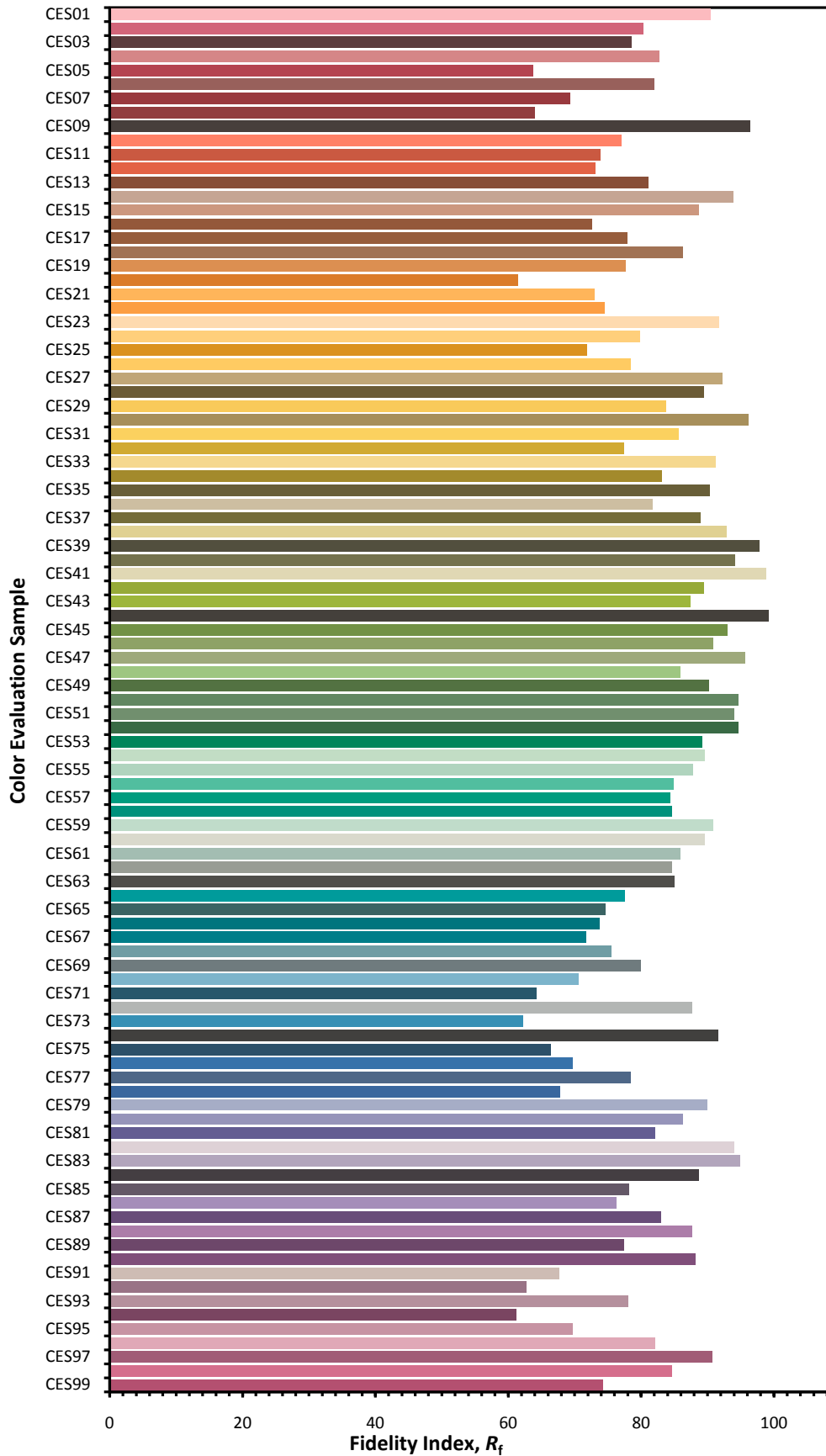


Color Vector Graphic

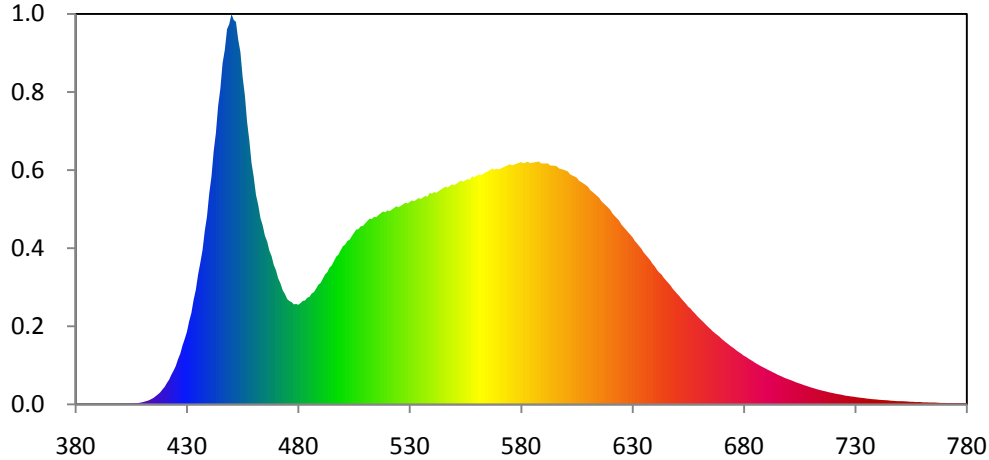


— Reference Illuminat    — Test Source

**Color Fidelity by CES Sample**



**Relative Spectral Power Distribution**

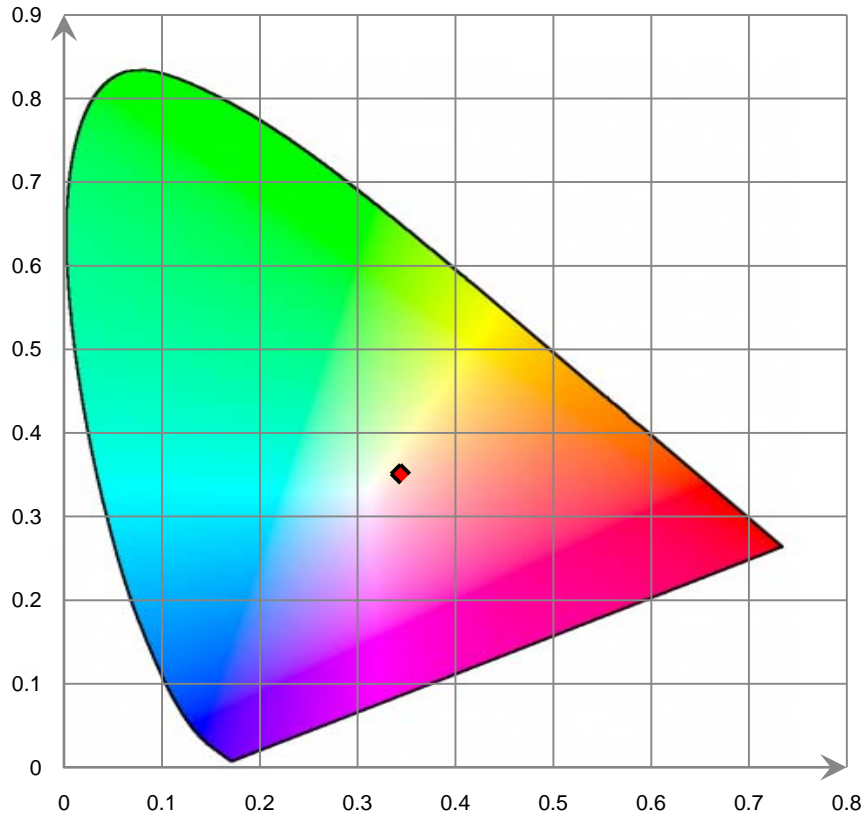


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.471E-01	421	1.931E+01	462	1.808E+02	503	1.492E+02	544	1.948E+02
381	1.550E-01	422	2.242E+01	463	1.689E+02	504	1.525E+02	545	1.961E+02
382	1.865E-01	423	2.683E+01	464	1.623E+02	505	1.555E+02	546	1.973E+02
383	1.843E-01	424	3.064E+01	465	1.529E+02	506	1.585E+02	547	1.967E+02
384	1.370E-01	425	3.478E+01	466	1.477E+02	507	1.589E+02	548	1.981E+02
385	1.359E-01	426	4.091E+01	467	1.394E+02	508	1.615E+02	549	1.995E+02
386	1.494E-01	427	4.588E+01	468	1.343E+02	509	1.617E+02	550	1.988E+02
387	1.472E-01	428	5.326E+01	469	1.263E+02	510	1.640E+02	551	2.001E+02
388	1.340E-01	429	5.930E+01	470	1.214E+02	511	1.663E+02	552	2.015E+02
389	1.479E-01	430	6.572E+01	471	1.141E+02	512	1.684E+02	553	2.028E+02
390	1.332E-01	431	7.539E+01	472	1.096E+02	513	1.681E+02	554	2.020E+02
391	1.413E-01	432	8.290E+01	473	1.034E+02	514	1.700E+02	555	2.032E+02
392	1.321E-01	433	9.468E+01	474	1.001E+02	515	1.697E+02	556	2.044E+02
393	9.390E-02	434	1.040E+02	475	9.552E+01	516	1.716E+02	557	2.036E+02
394	1.241E-01	435	1.176E+02	476	9.366E+01	517	1.733E+02	558	2.067E+02
395	1.336E-01	436	1.283E+02	477	9.269E+01	518	1.748E+02	559	2.060E+02
396	1.325E-01	437	1.398E+02	478	9.065E+01	519	1.742E+02	560	2.073E+02
397	1.124E-01	438	1.571E+02	479	9.104E+01	520	1.759E+02	561	2.084E+02
398	1.194E-01	439	1.703E+02	480	9.033E+01	521	1.752E+02	562	2.077E+02
399	1.436E-01	440	1.910E+02	481	9.181E+01	522	1.767E+02	563	2.091E+02
400	2.267E-01	441	2.063E+02	482	9.377E+01	523	1.782E+02	564	2.103E+02
401	2.842E-01	442	2.294E+02	483	9.424E+01	524	1.796E+02	565	2.112E+02
402	3.807E-01	443	2.460E+02	484	9.668E+01	525	1.787E+02	566	2.124E+02
403	4.356E-01	444	2.706E+02	485	9.752E+01	526	1.800E+02	567	2.137E+02
404	5.443E-01	445	2.862E+02	486	1.005E+02	527	1.813E+02	568	2.128E+02
405	7.167E-01	446	3.093E+02	487	1.018E+02	528	1.828E+02	569	2.138E+02
406	8.479E-01	447	3.214E+02	488	1.050E+02	529	1.822E+02	570	2.130E+02
407	9.793E-01	448	3.401E+02	489	1.085E+02	530	1.835E+02	571	2.140E+02
408	1.164E+00	449	3.448E+02	490	1.102E+02	531	1.849E+02	572	2.150E+02
409	1.551E+00	450	3.540E+02	491	1.139E+02	532	1.842E+02	573	2.160E+02
410	1.941E+00	451	3.485E+02	492	1.178E+02	533	1.856E+02	574	2.168E+02
411	2.500E+00	452	3.468E+02	493	1.199E+02	534	1.870E+02	575	2.177E+02
412	3.071E+00	453	3.309E+02	494	1.240E+02	535	1.863E+02	576	2.167E+02
413	3.759E+00	454	3.195E+02	495	1.259E+02	536	1.877E+02	577	2.175E+02
414	4.824E+00	455	2.968E+02	496	1.299E+02	537	1.890E+02	578	2.183E+02
415	5.861E+00	456	2.804E+02	497	1.339E+02	538	1.883E+02	579	2.190E+02
416	7.499E+00	457	2.562E+02	498	1.358E+02	539	1.919E+02	580	2.197E+02
417	9.108E+00	458	2.394E+02	499	1.397E+02	540	1.911E+02	581	2.186E+02
418	1.086E+01	459	2.188E+02	500	1.434E+02	541	1.925E+02	582	2.193E+02
419	1.349E+01	460	2.059E+02	501	1.448E+02	542	1.919E+02	583	2.200E+02
420	1.586E+01	461	1.899E+02	502	1.482E+02	543	1.933E+02	584	2.187E+02

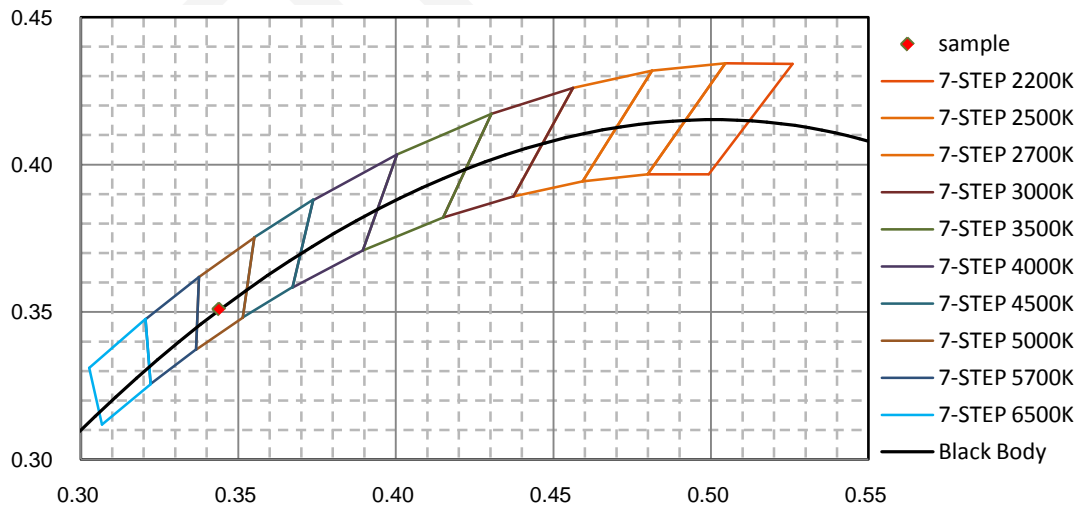


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.191E+02	626	1.607E+02	667	6.455E+01	708	1.681E+01	749	2.910E+00
586	2.195E+02	627	1.585E+02	668	6.296E+01	709	1.609E+01	750	2.904E+00
587	2.198E+02	628	1.562E+02	669	6.140E+01	710	1.545E+01	751	2.879E+00
588	2.201E+02	629	1.538E+02	670	5.939E+01	711	1.482E+01	752	2.790E+00
589	2.185E+02	630	1.515E+02	671	5.773E+01	712	1.423E+01	753	2.639E+00
590	2.184E+02	631	1.483E+02	672	5.609E+01	713	1.361E+01	754	2.475E+00
591	2.184E+02	632	1.460E+02	673	5.454E+01	714	1.310E+01	755	2.343E+00
592	2.185E+02	633	1.435E+02	674	5.292E+01	715	1.253E+01	756	2.353E+00
593	2.166E+02	634	1.410E+02	675	5.154E+01	716	1.207E+01	757	2.124E+00
594	2.165E+02	635	1.377E+02	676	5.001E+01	717	1.161E+01	758	2.100E+00
595	2.163E+02	636	1.354E+02	677	4.836E+01	718	1.106E+01	759	2.186E+00
596	2.159E+02	637	1.330E+02	678	4.701E+01	719	1.061E+01	760	1.923E+00
597	2.139E+02	638	1.305E+02	679	4.562E+01	720	1.021E+01	761	1.790E+00
598	2.134E+02	639	1.274E+02	680	4.405E+01	721	9.744E+00	762	1.828E+00
599	2.127E+02	640	1.251E+02	681	4.301E+01	722	9.371E+00	763	1.694E+00
600	2.120E+02	641	1.219E+02	682	4.157E+01	723	9.033E+00	764	1.704E+00
601	2.111E+02	642	1.194E+02	683	4.032E+01	724	8.682E+00	765	1.691E+00
602	2.085E+02	643	1.178E+02	684	3.910E+01	725	8.138E+00	766	1.615E+00
603	2.075E+02	644	1.148E+02	685	3.774E+01	726	7.799E+00	767	1.476E+00
604	2.066E+02	645	1.125E+02	686	3.648E+01	727	7.542E+00	768	1.355E+00
605	2.055E+02	646	1.102E+02	687	3.537E+01	728	7.217E+00	769	1.314E+00
606	2.027E+02	647	1.079E+02	688	3.427E+01	729	7.000E+00	770	1.313E+00
607	2.016E+02	648	1.050E+02	689	3.323E+01	730	6.654E+00	771	1.254E+00
608	2.003E+02	649	1.026E+02	690	3.219E+01	731	6.361E+00	772	1.239E+00
609	1.988E+02	650	1.003E+02	691	3.111E+01	732	6.071E+00	773	1.265E+00
610	1.973E+02	651	9.825E+01	692	3.016E+01	733	5.866E+00	774	1.144E+00
611	1.943E+02	652	9.560E+01	693	2.907E+01	734	5.657E+00	775	1.142E+00
612	1.927E+02	653	9.334E+01	694	2.813E+01	735	5.316E+00	776	1.150E+00
613	1.909E+02	654	9.115E+01	695	2.701E+01	736	5.089E+00	777	1.196E+00
614	1.891E+02	655	8.854E+01	696	2.614E+01	737	4.846E+00	778	1.149E+00
615	1.873E+02	656	8.696E+01	697	2.527E+01	738	4.679E+00	779	1.138E+00
616	1.842E+02	657	8.448E+01	698	2.426E+01	739	4.537E+00	780	1.128E+00
617	1.824E+02	658	8.251E+01	699	2.348E+01	740	4.316E+00		
618	1.804E+02	659	8.010E+01	700	2.270E+01	741	4.095E+00		
619	1.785E+02	660	7.813E+01	701	2.202E+01	742	3.951E+00		
620	1.764E+02	661	7.616E+01	702	2.117E+01	743	3.868E+00		
621	1.731E+02	662	7.428E+01	703	2.037E+01	744	3.735E+00		
622	1.708E+02	663	7.205E+01	704	1.952E+01	745	3.573E+00		
623	1.687E+02	664	7.012E+01	705	1.889E+01	746	3.337E+00		
624	1.666E+02	665	6.828E+01	706	1.818E+01	747	3.231E+00		
625	1.631E+02	666	6.624E+01	707	1.740E+01	748	3.060E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



**[Goniophotometer System]**

Total operating time for luminous intensity distribution: **1.0 hours**

Test orientation: **Downward**

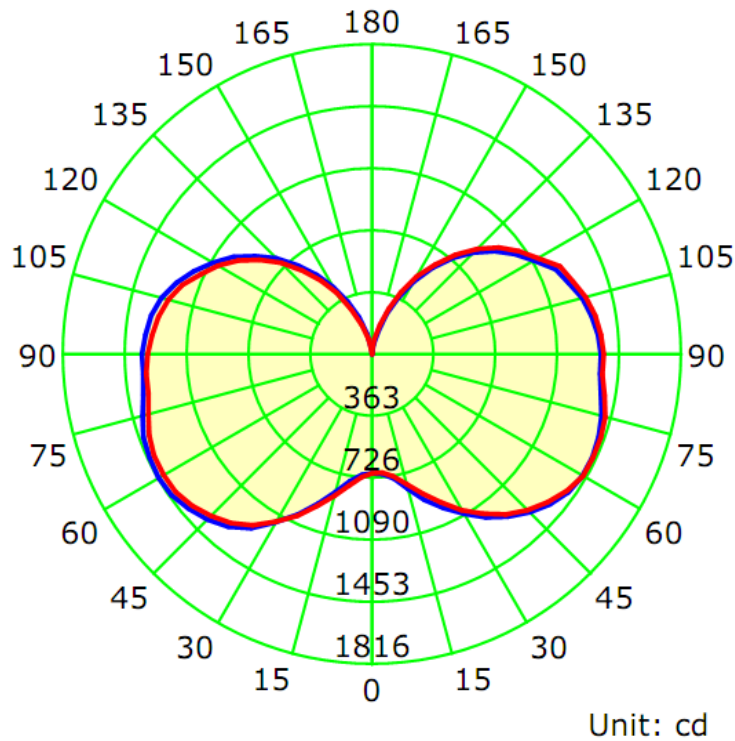
**Electrical Measurement**

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.8320	99.92	1.0000

**Photometric Measurement**

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
13790.8	138.02	1453.5	2.47	2.44

**Luminous Intensity Distribution**



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	278.7	280.6	278.8	280.9	279.8
Field Angle (10% I <sub>max</sub> ):	329.3	330.3	329.2	330.6	329.9

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	698	698	698	698	698	698	698	698
5.0°	706	706	699	698	698	702	705	705
10.0°	742	739	734	724	726	727	738	735
15.0°	815	803	794	790	789	794	809	797
20.0°	909	887	875	876	871	880	899	879
25.0°	996	990	967	967	958	966	999	976
30.0°	1082	1071	1051	1064	1054	1050	1085	1055
35.0°	1166	1153	1138	1150	1140	1133	1173	1132
40.0°	1245	1224	1204	1231	1227	1203	1238	1209
45.0°	1314	1274	1260	1286	1296	1261	1289	1269
50.0°	1368	1313	1298	1338	1348	1303	1328	1316
55.0°	1411	1332	1321	1379	1398	1337	1351	1350
60.0°	1429	1345	1337	1405	1430	1354	1367	1377
65.0°	1431	1346	1341	1413	1434	1356	1366	1390
70.0°	1418	1327	1321	1402	1430	1351	1353	1387
75.0°	1398	1304	1295	1394	1422	1322	1321	1358
80.0°	1366	1265	1262	1365	1389	1303	1283	1335
85.0°	1345	1246	1239	1338	1359	1270	1264	1317
90.0°	1344	1243	1238	1330	1361	1265	1251	1317
95.0°	1333	1232	1228	1327	1350	1256	1245	1310
100.0°	1311	1213	1212	1301	1333	1239	1228	1289
105.0°	1279	1189	1188	1273	1301	1209	1200	1257
110.0°	1231	1152	1146	1226	1256	1162	1158	1205
115.0°	1189	1117	1111	1186	1221	1123	1119	1165
120.0°	1100	1031	1033	1098	1131	1039	1040	1073
125.0°	1025	964	967	1016	1057	972	981	1000
130.0°	941	891	896	933	975	897	909	918
135.0°	848	807	812	843	872	811	823	822
140.0°	744	709	719	740	763	717	728	714
145.0°	620	603	614	625	643	610	621	599
150.0°	497	497	505	520	532	501	517	485
155.0°	367	380	394	403	404	389	397	368
160.0°	255	272	281	287	288	278	282	252
165.0°	149	166	171	175	180	173	171	151
170.0°	64	80	82	83	91	83	81	72
175.0°	21	24	27	29	29	28	26	22
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°	698	698	698	698	698	698	698	698
5.0°	711	719	715	713	722	717	717	716
10.0°	758	768	774	762	781	774	770	766
15.0°	839	849	853	842	858	853	856	844
20.0°	932	944	951	934	947	947	942	933
25.0°	1037	1032	1039	1027	1048	1037	1030	1039
30.0°	1142	1121	1123	1110	1136	1123	1115	1120
35.0°	1244	1197	1197	1191	1223	1196	1190	1207
40.0°	1319	1264	1260	1252	1292	1261	1253	1278
45.0°	1371	1317	1299	1299	1344	1294	1295	1326
50.0°	1410	1351	1326	1344	1384	1324	1322	1365
55.0°	1443	1374	1341	1375	1410	1340	1340	1396
60.0°	1453	1380	1345	1389	1420	1348	1345	1409
65.0°	1441	1371	1326	1384	1415	1335	1336	1401
70.0°	1432	1357	1308	1376	1396	1319	1311	1387
75.0°	1397	1312	1268	1350	1364	1279	1273	1354
80.0°	1365	1281	1241	1323	1337	1254	1247	1325
85.0°	1352	1269	1235	1328	1332	1249	1237	1315
90.0°	1352	1265	1231	1317	1320	1246	1234	1308
95.0°	1337	1249	1218	1296	1300	1228	1223	1290
100.0°	1317	1226	1198	1274	1275	1206	1204	1260
105.0°	1283	1190	1163	1222	1241	1173	1172	1224
110.0°	1225	1142	1113	1167	1188	1118	1123	1172
115.0°	1158	1080	1054	1102	1114	1054	1060	1103
120.0°	1080	1014	986	1023	1045	985	992	1027
125.0°	996	945	914	943	963	912	924	944
130.0°	900	872	830	852	867	835	845	858
135.0°	795	779	739	746	762	742	758	773
140.0°	683	676	639	638	642	639	661	669
145.0°	569	572	531	525	527	534	547	559
150.0°	458	462	420	404	415	419	438	453
155.0°	343	343	305	289	291	305	318	333
160.0°	230	229	196	175	181	198	205	221
165.0°	127	123	102	89	93	103	112	121
170.0°	50	49	39	31	29	36	45	49
175.0°	18	15	12	10	10	11	13	15
180.0°	0	0	0	0	0	0	0	0

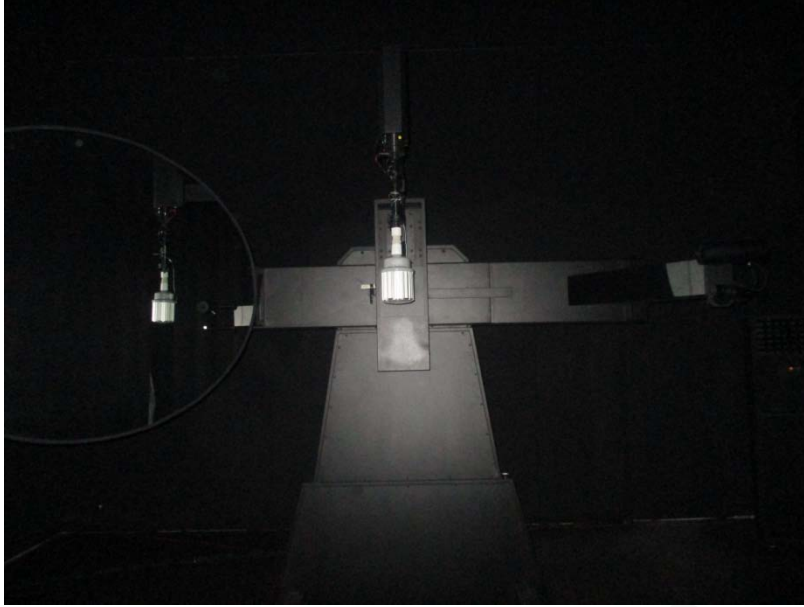
Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	16.8	0.12	0-5	16.8	0.12
5-10	52.2	0.38	0-10	69.1	0.50
10-15	93.4	0.68	0-15	162.5	1.18
15-20	143.1	1.04	0-20	305.6	2.22
20-25	201.3	1.46	0-25	507.0	3.68
25-30	265.8	1.93	0-30	772.8	5.60
30-35	334.4	2.42	0-35	1107.2	8.03
35-40	404.5	2.93	0-40	1511.6	10.96
40-45	471.6	3.42	0-45	1983.2	14.38
45-50	533.3	3.87	0-50	2516.6	18.25
50-55	588.9	4.27	0-55	3105.5	22.52
55-60	636.1	4.61	0-60	3741.5	27.13
60-65	671.8	4.87	0-65	4413.4	32.00
65-70	695.7	5.04	0-70	5109.0	37.05
70-75	707.1	5.13	0-75	5816.1	42.17
75-80	708.2	5.14	0-80	6524.4	47.31
80-85	707.1	5.13	0-85	7231.4	52.44
85-90	707.0	5.13	0-90	7938.5	57.56
90-95	702.3	5.09	0-95	8640.8	62.66
95-100	687.9	4.99	0-100	9328.7	67.64
100-105	663.0	4.81	0-105	9991.7	72.45
105-110	626.4	4.54	0-110	10618.1	76.99
110-115	581.4	4.22	0-115	11199.5	81.21
115-120	526.5	3.82	0-120	11726.0	85.03
120-125	465.5	3.38	0-125	12191.5	88.40
125-130	404.2	2.93	0-130	12595.6	91.33
130-135	340.3	2.47	0-135	12936.0	93.80
135-140	275.6	2.00	0-140	13211.6	95.80
140-145	212.5	1.54	0-145	13424.1	97.34
145-150	154.8	1.12	0-150	13578.9	98.46
150-155	104.0	0.75	0-155	13682.9	99.22
155-160	62.0	0.45	0-160	13744.9	99.67
160-165	31.1	0.23	0-165	13776.0	99.89
165-170	11.7	0.09	0-170	13787.7	99.98
170-175	2.8	0.02	0-175	13790.6	100.00
175-180	0.2	0.00	0-180	13790.8	100.00

## 6. Product Photo



## 7. Product Test orientation in the Goniophotometer



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

FINAL