



# IES LM-79-08

## MEASUREMENT AND TEST REPORT

For

### GREEN CREATIVE LTD

Room 3603, Level 36, Tower 1, Enterprise Square Five, 38 Wang Chiu Road, Kowloon Bay, KL, Hong Kong

**Test Model: 24HID/830/277V/E26/DIM**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
<b>Reviewed By:</b>	George Chen <i>George Chen</i>
<b>Report Number:</b>	KS2210713-47089E-10-1
<b>Test Date:</b>	2021-07-14 to 2021-07-15
<b>Report Date:</b>	2021-12-10
<b>Approved by:</b>	Bill Xiong / EE Engineer
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Dongguan). No.12, Pulong East 1 <sup>st</sup> Road, Tangxia Town, Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax: +86-0769-86858588

## 1. Product Description

### General Information:

Two test samples were in good condition and received on 2021-07-13. One was tested in integrating sphere and the other was tested in goniophotometer

Model Tested: 24HID/830/277V/E26/DIM  
Manufacturer: GREEN CREATIVE LTD  
Product Designation: Omnidirectional LED Lamp  
Burning Time Before Test: 0hour(For New Products)

### #Rated Values:

Rated Voltage/Frequency: 120-277VAC 50/60Hz  
Rated Power: 24W  
Nominal CCT: 3000K  
Nominal Lumen Output: 3100lm

## 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
- IES TM-30-18: 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	Calibration date	Calibration due date
1.5m integrating sphere	SENSING	1.5m	NA	2021-06-30	2022-06-29
Digital power meter	EVERFINE	PF9811	G135717CN1361159	2021-09-23	2022-09-22
High-precision rapid spectral radiometer	EVERFINE	HAAS-2000	N/A	2021-06-30	2022-06-29
Precision frequency power supply	ALL Power	APW-105N	970663	2021-01-04	2022-01-03
Standard Light Source	EVERFINE	D204	N/A	2021-10-15	2022-10-14
thermometer	SENSING	NA	NA	2021-04-27	2022-04-26
Programmable Precision DC Power Supply	EVERFINE	WY5015	11060010	2021-06-30	2022-06-29
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	2021-01-04	2022-01-03
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	2021-01-04	2022-01-03
Digital power meter	YOKOGAWA	WT-210	91j926132	2021-01-04	2022-01-03
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	2021-03-12	2022-03-11
wireless remote thermohygrometer	N/A	433MHz	N/A	2021-04-27	2022-04-26
Standard Light Source	EVERFINE	D908	1012003	2021-10-15	2022-10-14

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  $U=2.1\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=21\text{K}$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the CRI is  $U=2.1(K=2)$ , at the 95% confidence level.

The uncertainty of power meter AC current  $U=0.19\%$  of rdg, AC Voltage  $U=0.17\%$  of rdg, Power  $U=0.48\%$  ( $K=2$ ), 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  $U=2.00\%$  ( $K=2$ ), 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: **Base up**

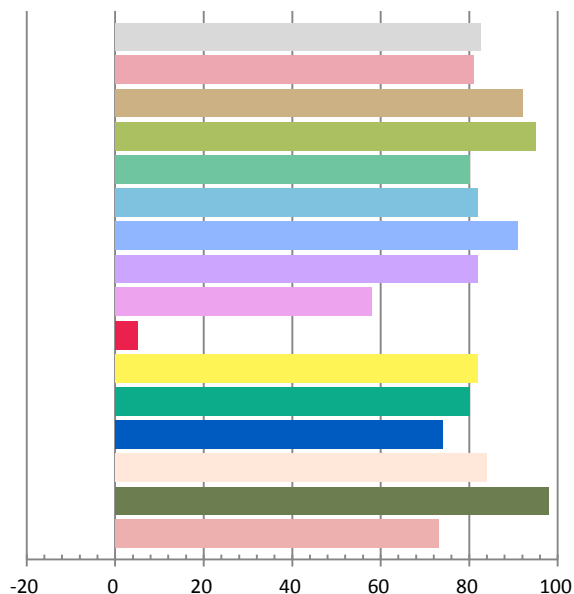
### Photometric and Electrical Measurement Result

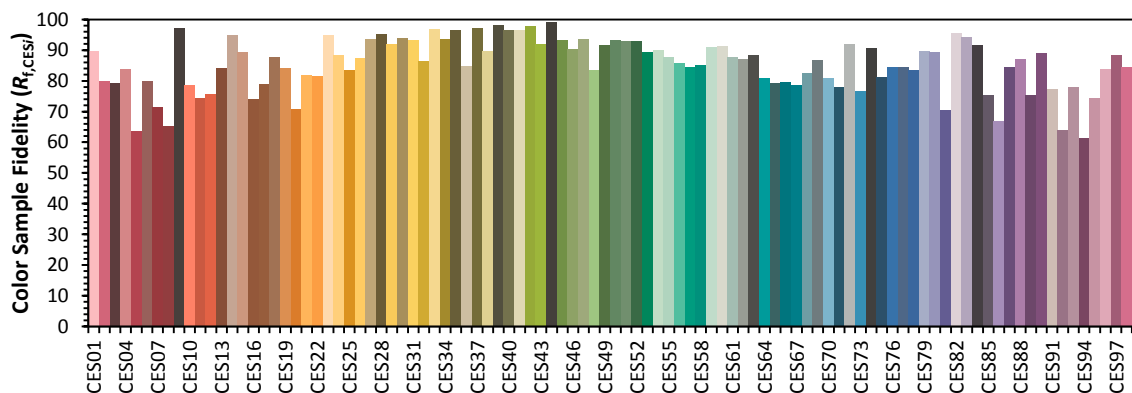
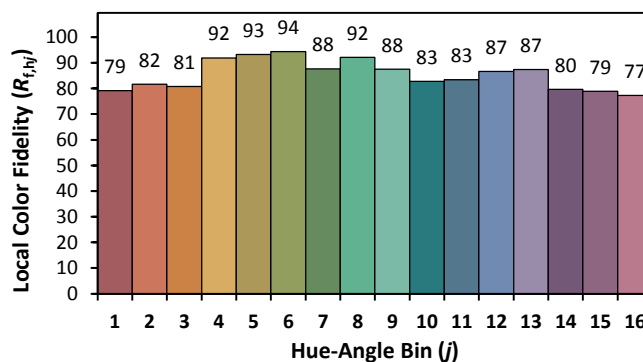
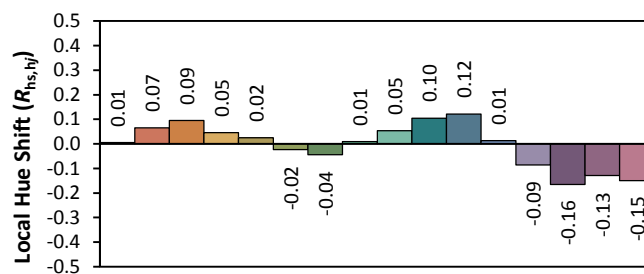
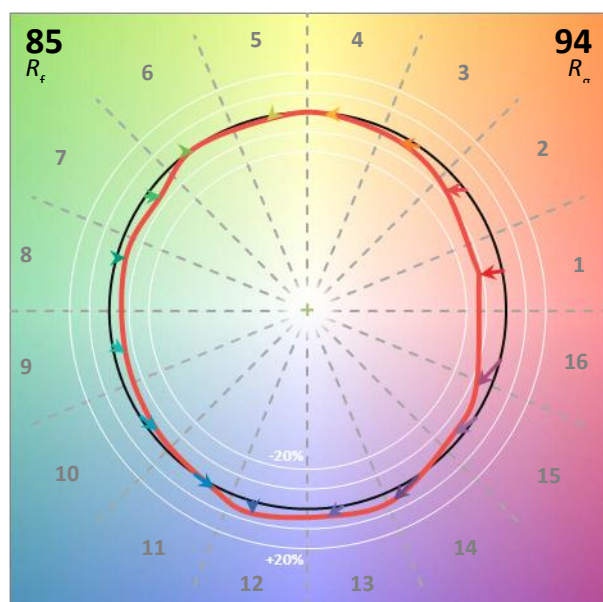
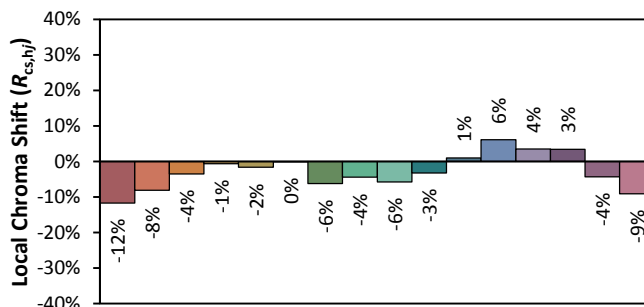
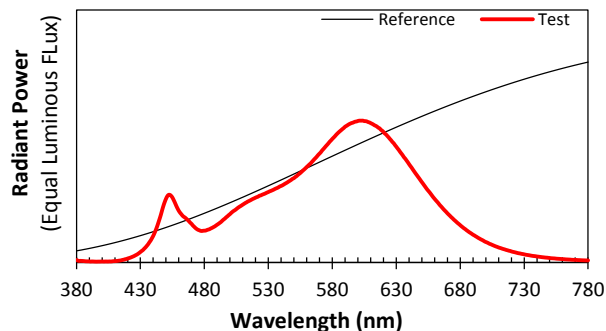
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.1971	23.50	0.9942	3103.2	132.03

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
9.3829	3011	0.000808	0.4374	0.4063	0.2499	0.5223

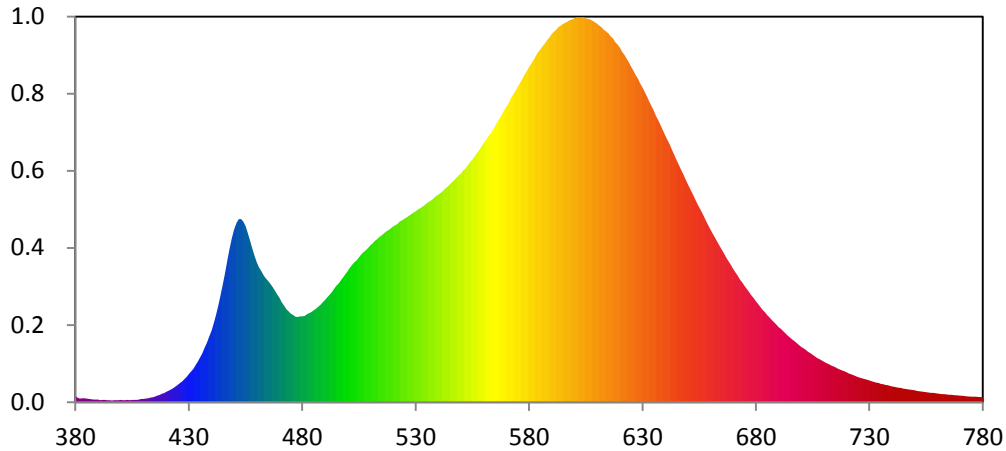
### Color Rendering Index

<b>Ra</b>			
82.6			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
81	92	95	80
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
82	91	82	58
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
5	82	80	74
<b>R13</b>	<b>R14</b>	<b>R15</b>	
84	98	73	





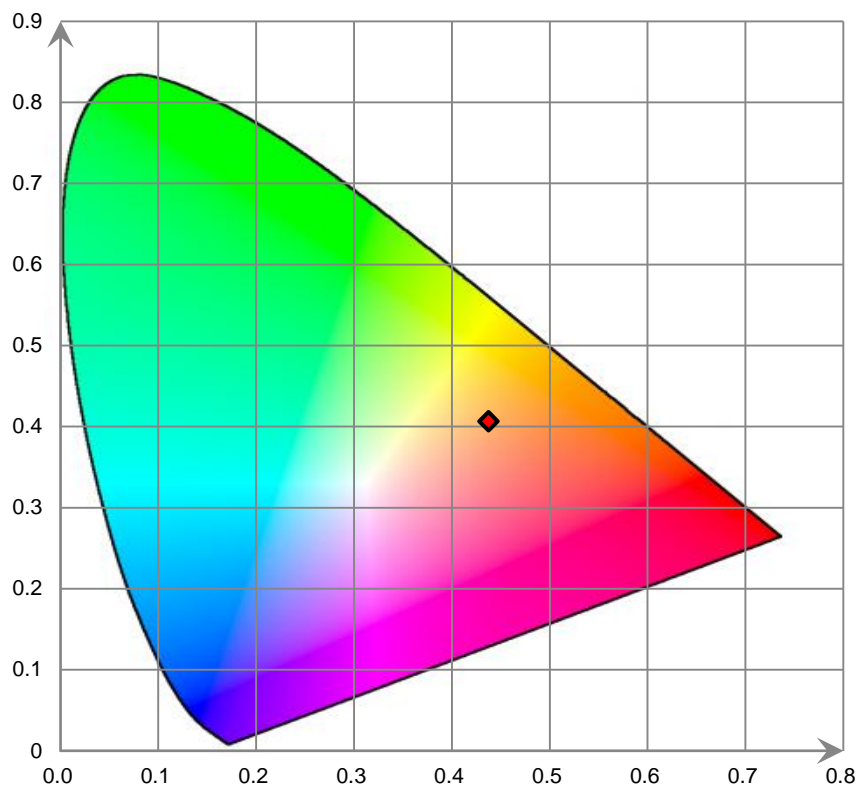
Relative Spectral Power Distribution



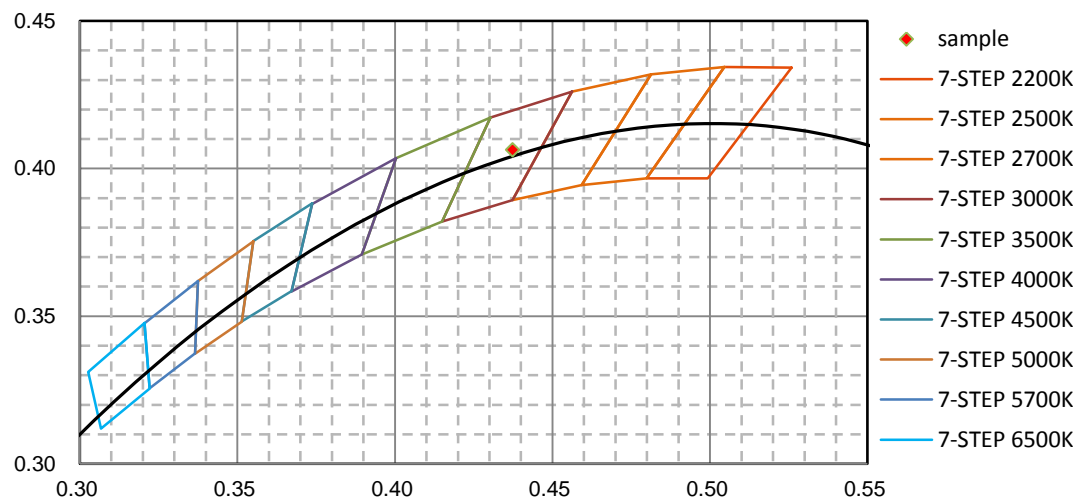
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.040E+00	421	1.909E+00	462	2.164E+01	503	2.317E+01	544	3.568E+01
381	7.867E-01	422	2.086E+00	463	2.093E+01	504	2.352E+01	545	3.603E+01
382	6.261E-01	423	2.324E+00	464	2.046E+01	505	2.397E+01	546	3.641E+01
383	6.682E-01	424	2.567E+00	465	2.007E+01	506	2.444E+01	547	3.677E+01
384	6.416E-01	425	2.823E+00	466	1.955E+01	507	2.485E+01	548	3.715E+01
385	6.085E-01	426	3.142E+00	467	1.904E+01	508	2.521E+01	549	3.760E+01
386	5.520E-01	427	3.430E+00	468	1.845E+01	509	2.556E+01	550	3.787E+01
387	4.864E-01	428	3.794E+00	469	1.782E+01	510	2.596E+01	551	3.837E+01
388	4.524E-01	429	4.210E+00	470	1.730E+01	511	2.632E+01	552	3.875E+01
389	4.451E-01	430	4.664E+00	471	1.658E+01	512	2.670E+01	553	3.929E+01
390	4.237E-01	431	5.121E+00	472	1.603E+01	513	2.701E+01	554	3.975E+01
391	3.448E-01	432	5.550E+00	473	1.546E+01	514	2.738E+01	555	4.020E+01
392	4.077E-01	433	6.182E+00	474	1.501E+01	515	2.764E+01	556	4.074E+01
393	3.809E-01	434	6.747E+00	475	1.465E+01	516	2.793E+01	557	4.127E+01
394	3.520E-01	435	7.439E+00	476	1.443E+01	517	2.825E+01	558	4.177E+01
395	3.198E-01	436	8.145E+00	477	1.418E+01	518	2.856E+01	559	4.230E+01
396	3.151E-01	437	9.021E+00	478	1.411E+01	519	2.881E+01	560	4.289E+01
397	3.415E-01	438	9.839E+00	479	1.420E+01	520	2.910E+01	561	4.341E+01
398	3.372E-01	439	1.084E+01	480	1.425E+01	521	2.935E+01	562	4.398E+01
399	3.648E-01	440	1.190E+01	481	1.430E+01	522	2.956E+01	563	4.448E+01
400	3.872E-01	441	1.316E+01	482	1.454E+01	523	2.996E+01	564	4.512E+01
401	3.648E-01	442	1.453E+01	483	1.473E+01	524	3.010E+01	565	4.576E+01
402	3.560E-01	443	1.607E+01	484	1.491E+01	525	3.038E+01	566	4.641E+01
403	3.998E-01	444	1.779E+01	485	1.525E+01	526	3.062E+01	567	4.699E+01
404	3.598E-01	445	1.957E+01	486	1.550E+01	527	3.083E+01	568	4.764E+01
405	3.784E-01	446	2.144E+01	487	1.583E+01	528	3.111E+01	569	4.834E+01
406	4.068E-01	447	2.352E+01	488	1.614E+01	529	3.140E+01	570	4.892E+01
407	3.876E-01	448	2.547E+01	489	1.654E+01	530	3.163E+01	571	4.952E+01
408	4.582E-01	449	2.715E+01	490	1.695E+01	531	3.194E+01	572	5.029E+01
409	5.417E-01	450	2.860E+01	491	1.733E+01	532	3.214E+01	573	5.093E+01
410	5.348E-01	451	2.974E+01	492	1.775E+01	533	3.240E+01	574	5.158E+01
411	6.037E-01	452	3.035E+01	493	1.817E+01	534	3.265E+01	575	5.227E+01
412	6.505E-01	453	3.035E+01	494	1.873E+01	535	3.297E+01	576	5.289E+01
413	7.485E-01	454	2.991E+01	495	1.924E+01	536	3.324E+01	577	5.355E+01
414	8.222E-01	455	2.915E+01	496	1.968E+01	537	3.348E+01	578	5.427E+01
415	9.239E-01	456	2.802E+01	497	2.024E+01	538	3.378E+01	579	5.486E+01
416	1.096E+00	457	2.679E+01	498	2.070E+01	539	3.414E+01	580	5.551E+01
417	1.206E+00	458	2.545E+01	499	2.123E+01	540	3.437E+01	581	5.610E+01
418	1.393E+00	459	2.425E+01	500	2.169E+01	541	3.465E+01	582	5.668E+01
419	1.518E+00	460	2.318E+01	501	2.225E+01	542	3.499E+01	583	5.736E+01
420	1.731E+00	461	2.233E+01	502	2.275E+01	543	3.536E+01	584	5.794E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.850E+01	626	5.492E+01	667	2.389E+01	708	7.140E+00	749	2.018E+00
586	5.901E+01	627	5.416E+01	668	2.329E+01	709	6.934E+00	750	1.961E+00
587	5.949E+01	628	5.360E+01	669	2.271E+01	710	6.699E+00	751	1.866E+00
588	6.000E+01	629	5.279E+01	670	2.206E+01	711	6.510E+00	752	1.829E+00
589	6.045E+01	630	5.206E+01	671	2.149E+01	712	6.333E+00	753	1.789E+00
590	6.101E+01	631	5.129E+01	672	2.094E+01	713	6.124E+00	754	1.747E+00
591	6.136E+01	632	5.056E+01	673	2.034E+01	714	5.948E+00	755	1.664E+00
592	6.173E+01	633	4.972E+01	674	1.983E+01	715	5.787E+00	756	1.618E+00
593	6.211E+01	634	4.897E+01	675	1.923E+01	716	5.577E+00	757	1.584E+00
594	6.239E+01	635	4.822E+01	676	1.874E+01	717	5.435E+00	758	1.545E+00
595	6.266E+01	636	4.733E+01	677	1.821E+01	718	5.248E+00	759	1.506E+00
596	6.281E+01	637	4.667E+01	678	1.769E+01	719	5.131E+00	760	1.451E+00
597	6.308E+01	638	4.586E+01	679	1.724E+01	720	4.925E+00	761	1.426E+00
598	6.329E+01	639	4.507E+01	680	1.673E+01	721	4.747E+00	762	1.373E+00
599	6.338E+01	640	4.420E+01	681	1.623E+01	722	4.637E+00	763	1.325E+00
600	6.359E+01	641	4.338E+01	682	1.577E+01	723	4.482E+00	764	1.295E+00
601	6.372E+01	642	4.262E+01	683	1.531E+01	724	4.338E+00	765	1.259E+00
602	6.374E+01	643	4.175E+01	684	1.493E+01	725	4.170E+00	766	1.238E+00
603	6.374E+01	644	4.092E+01	685	1.444E+01	726	4.070E+00	767	1.167E+00
604	6.374E+01	645	4.009E+01	686	1.404E+01	727	3.966E+00	768	1.144E+00
605	6.355E+01	646	3.931E+01	687	1.360E+01	728	3.814E+00	769	1.117E+00
606	6.352E+01	647	3.851E+01	688	1.324E+01	729	3.736E+00	770	1.086E+00
607	6.340E+01	648	3.773E+01	689	1.286E+01	730	3.604E+00	771	1.079E+00
608	6.312E+01	649	3.690E+01	690	1.244E+01	731	3.469E+00	772	1.025E+00
609	6.294E+01	650	3.610E+01	691	1.214E+01	732	3.362E+00	773	1.003E+00
610	6.264E+01	651	3.534E+01	692	1.176E+01	733	3.280E+00	774	9.715E-01
611	6.236E+01	652	3.454E+01	693	1.142E+01	734	3.190E+00	775	9.392E-01
612	6.205E+01	653	3.374E+01	694	1.104E+01	735	3.066E+00	776	9.167E-01
613	6.166E+01	654	3.293E+01	695	1.073E+01	736	2.963E+00	777	8.989E-01
614	6.140E+01	655	3.224E+01	696	1.039E+01	737	2.876E+00	778	8.750E-01
615	6.104E+01	656	3.155E+01	697	1.010E+01	738	2.816E+00	779	8.648E-01
616	6.057E+01	657	3.080E+01	698	9.796E+00	739	2.748E+00	780	8.665E-01
617	6.027E+01	658	3.002E+01	699	9.435E+00	740	2.637E+00		
618	5.963E+01	659	2.925E+01	700	9.150E+00	741	2.565E+00		
619	5.922E+01	660	2.857E+01	701	8.932E+00	742	2.482E+00		
620	5.867E+01	661	2.788E+01	702	8.641E+00	743	2.413E+00		
621	5.798E+01	662	2.725E+01	703	8.323E+00	744	2.334E+00		
622	5.754E+01	663	2.657E+01	704	8.130E+00	745	2.269E+00		
623	5.687E+01	664	2.582E+01	705	7.857E+00	746	2.196E+00		
624	5.625E+01	665	2.521E+01	706	7.615E+00	747	2.131E+00		
625	5.555E+01	666	2.456E+01	707	7.361E+00	748	2.099E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles





### [Goniophotometer System]

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

Test orientation: **Base up**

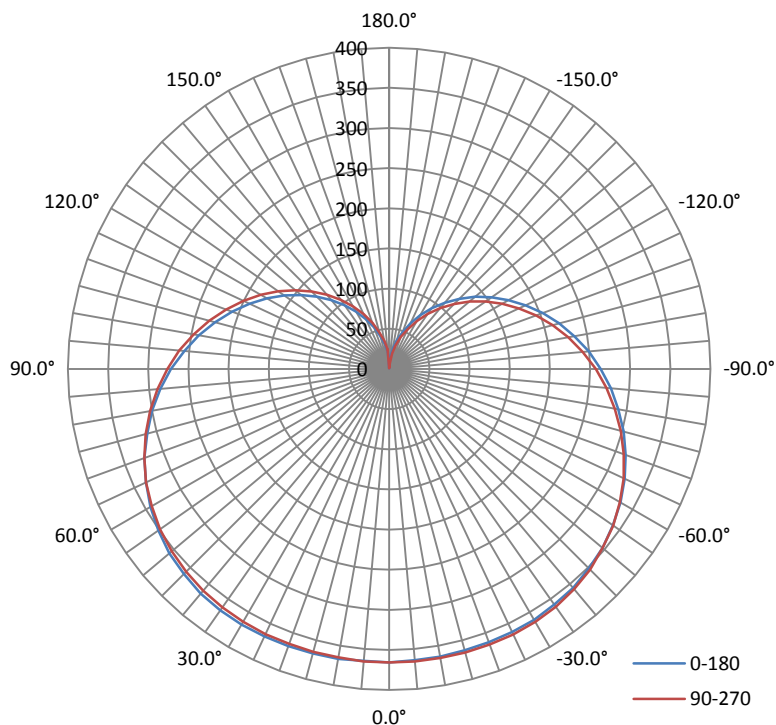
### Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.1972	23.52	0.9938

### Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I <sub>max</sub> (cd)	S/MH (C0/180)	S/MH (C90/270)
3116.85	132.52	368.2	1.51	1.52

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I <sub>max</sub> ):	233.6	234.0	234.1	233.2	233.7
Field Angle (10% I <sub>max</sub> ):	332.4	332.7	331.8	331.4	332.1

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	365	365	365	365	365	365	365	365
5.0°	365	367	365	366	366	365	364	364
10.0°	367	367	366	366	365	364	364	364
15.0°	367	367	366	366	365	364	364	363
20.0°	368	368	366	367	364	364	363	363
25.0°	368	368	367	366	365	363	362	362
30.0°	368	368	366	365	363	363	361	360
35.0°	367	368	366	365	362	361	359	358
40.0°	365	366	364	363	361	358	357	356
45.0°	362	363	362	360	358	356	354	353
50.0°	357	358	358	357	354	352	349	347
55.0°	351	353	352	351	348	346	344	342
60.0°	343	346	346	345	342	339	337	334
65.0°	334	337	337	336	334	331	328	325
70.0°	324	328	328	327	324	321	319	316
75.0°	312	316	317	317	314	311	307	305
80.0°	300	304	305	305	302	299	296	294
85.0°	286	290	292	292	290	287	284	281
90.0°	272	276	278	279	276	274	271	267
95.0°	256	261	263	264	262	259	257	253
100.0°	241	245	248	249	247	245	242	238
105.0°	225	229	232	233	232	230	227	223
110.0°	208	213	216	217	216	214	211	208
115.0°	192	197	200	201	200	199	196	192
120.0°	176	180	183	185	184	183	180	176
125.0°	159	164	167	169	168	166	164	160
130.0°	143	148	151	153	152	150	148	144
135.0°	127	132	135	136	136	135	132	128
140.0°	112	116	119	120	120	119	116	113
145.0°	97	101	103	105	105	104	101	97
150.0°	82	86	88	90	90	88	86	82
155.0°	68	71	74	75	75	74	71	68
160.0°	54	58	60	61	61	60	57	54
165.0°	42	45	47	48	48	46	44	41
170.0°	31	33	35	36	36	34	32	30
175.0°	21	23	24	25	24	23	22	19
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°	365	365	365	365	365	365	365	365
5.0°	364	365	365	365	366	365	366	366
10.0°	364	365	364	365	365	366	367	366
15.0°	363	364	364	365	366	366	367	367
20.0°	362	364	363	365	365	367	367	367
25.0°	361	363	363	364	365	366	367	368
30.0°	361	362	361	363	364	365	366	366
35.0°	358	360	360	361	362	363	364	366
40.0°	356	357	357	357	358	360	361	363
45.0°	352	353	353	353	354	355	357	360
50.0°	347	347	346	347	347	349	351	354
55.0°	340	339	339	340	340	342	344	348
60.0°	333	333	331	331	332	333	336	339
65.0°	323	323	321	322	322	323	326	330
70.0°	313	312	311	310	311	312	315	319
75.0°	302	300	299	299	299	300	303	307
80.0°	290	288	286	286	285	287	290	294
85.0°	277	275	273	272	272	273	276	280
90.0°	263	261	259	258	257	258	261	266
95.0°	249	246	244	243	242	243	246	251
100.0°	234	231	228	227	226	227	230	235
105.0°	219	216	213	212	211	211	214	219
110.0°	203	200	197	196	195	195	198	203
115.0°	187	184	181	179	178	179	182	186
120.0°	171	168	165	163	163	163	166	170
125.0°	156	152	149	147	146	147	150	154
130.0°	140	136	133	131	131	132	134	138
135.0°	123	119	117	115	114	115	117	121
140.0°	107	104	101	99	99	100	102	106
145.0°	92	89	86	84	83	85	87	91
150.0°	77	74	71	70	69	70	72	76
155.0°	63	61	58	56	55	56	58	61
160.0°	49	48	45	43	42	43	45	48
165.0°	37	36	33	31	30	31	33	36
170.0°	26	26	23	20	19	20	22	25
175.0°	15	14	10	8	7	8	10	10
180.0°	1	1	1	1	1	1	1	1

**Zonal Lumen Density Measurement**

Deg	Flux (lm)	%
0-5	8.7	0.28
5-10	26.1	0.84
10-15	43.3	1.39
15-20	60.2	1.93
20-25	76.5	2.46
25-30	92.2	2.95
30-35	107.0	3.44
35-40	120.5	3.86
40-45	132.6	4.26
45-50	143.0	4.59
50-55	151.4	4.85
55-60	157.7	5.07
60-65	161.8	5.19
65-70	163.7	5.25
70-75	163.4	5.24
75-80	160.9	5.17
80-85	156.5	5.02
85-90	150.1	4.81
90-95	142.3	4.57
95-100	133.1	4.27
100-105	122.8	3.94
105-110	111.7	3.58
110-115	100.1	3.21
115-120	88.3	2.84
120-125	76.5	2.45
125-130	65.0	2.09
130-135	53.9	1.73
135-140	43.5	1.39
140-145	34.1	1.09
145-150	25.6	0.83
150-155	18.3	0.58
155-160	12.3	0.40
160-165	7.5	0.24
165-170	4.0	0.13
170-175	1.6	0.05
175-180	0.2	0.01

Deg	Flux (lm)	%
0-5	8.7	0.28
0-10	34.9	1.12
0-15	78.2	2.51
0-20	138.4	4.44
0-25	214.9	6.90
0-30	307.1	9.85
0-35	414.1	13.29
0-40	534.7	17.15
0-45	667.3	21.41
0-50	810.3	26.00
0-55	961.7	30.85
0-60	1119.4	35.92
0-65	1281.3	41.11
0-70	1445.0	46.36
0-75	1608.4	51.60
0-80	1769.3	56.77
0-85	1925.7	61.79
0-90	2075.9	66.60
0-95	2218.2	71.17
0-100	2351.2	75.44
0-105	2474.0	79.38
0-110	2585.7	82.96
0-115	2685.9	86.17
0-120	2774.2	89.01
0-125	2850.7	91.46
0-130	2915.7	93.55
0-135	2969.6	95.28
0-140	3013.1	96.67
0-145	3047.2	97.76
0-150	3072.8	98.59
0-155	3091.1	99.17
0-160	3103.4	99.57
0-165	3111.0	99.81
0-170	3115.0	99.94
0-175	3116.6	99.99
0-180	3116.8	100.00

## 6. Product Photo



## Directions

1. The information marked "superscript #" is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.
2. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
3. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
4. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.
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\*\*\*\*\*END OF REPORT\*\*\*\*\*