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: 34HID/850/277V/E26/DIM

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Reviewed By:	George Chen
Report Number:	KS2210909-47105E-10-1
Test Date:	2021-11-10
Report Date:	2021-12-10
Approved by:	Bill Xiong / EE Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.12, Pulong East 1st 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 2021-09-09. One was tested in integrating sphere and the other was tested in goniophotometer

Model Tested:	34HID/850/277V/E26/DIM
Manufacturer:	GREEN CREATIVE LTD
Product Designation:	Omnidirectional LED Lamp
Burning Time Before Test:	0hour(For New Products)

#Rated Values:

Rated Voltage/Frequency:	120-277V AC, 50/60Hz
Rated Power:	34W
Nominal CCT:	5000K
Nominal Lumen Output:	5000lm

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
2.0m integrating sphere	EVERFINE	R98	11010018	2021-09-27	2022-09-26
spectroradiometer	EVERFINE	HAAS-2000	G112048TS81331121	2021-09-27	2022-09-26
Digital Power Meter	EVERFINE	PF2010A	1011004	2021-09-27	2022-09-26
Digital CC&CV DC Power Supply	EVERFINE	WY305-V1	1101047	2021-06-30	2022-06-29
Standard Light Source	EVERFINE	D204	N/A	2021-10-15	2022-10-14
Special zero-voltage synchronous switching AC	EVERFINE	DPS1010-YF	1011001T	2021-01-04	2022-01-03
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°C±1°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=2.1% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=22K (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=0.18% of rdg, Power U=0.46%) (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 intensity is U=2.00% (K=2), at the 95% confidence level.

Fidelity Index and Gamut Index Calculation

The R_f, 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**

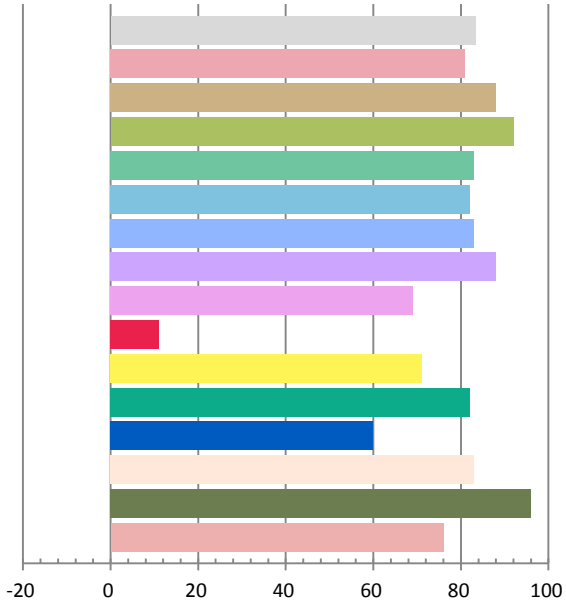
Photometric and Electrical Measurement Result

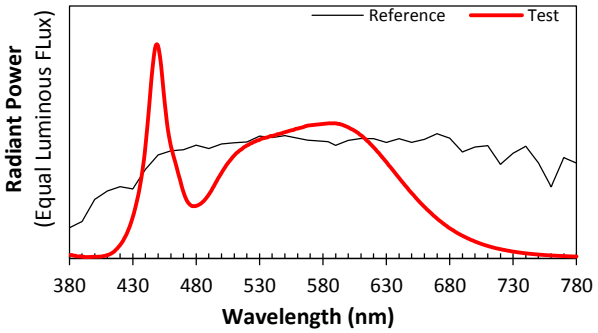
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.1	60	0.2828	33.89	0.9978	5017.8	148.08

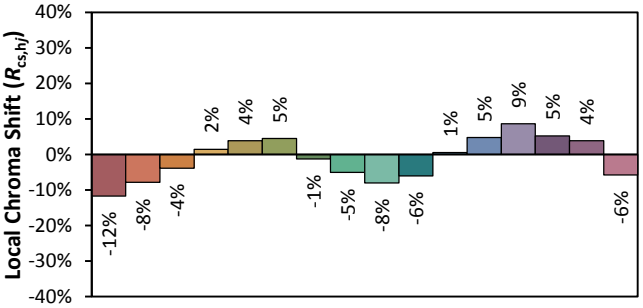
Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
15.668	4952	0.00251	0.3470	0.3582	0.2102	0.4881

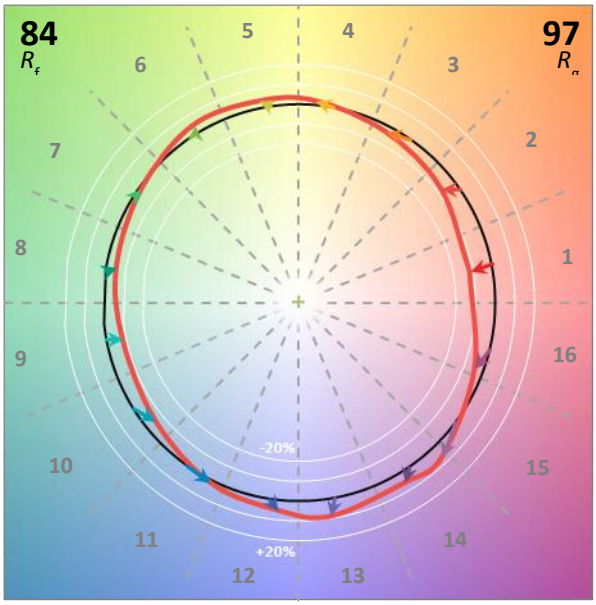
Color Rendering Index

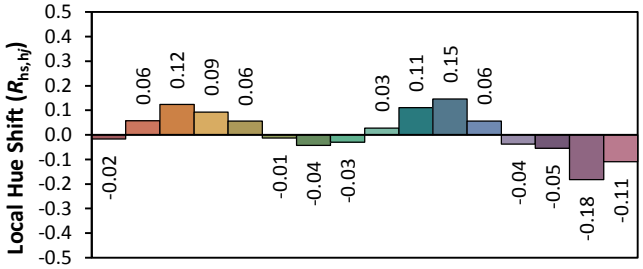
Ra			
83.3			
R1	R2	R3	R4
81	88	92	83
R5	R6	R7	R8
82	83	88	69
R9	R10	R11	R12
11	71	82	60
R13	R14	R15	
83	96	76	

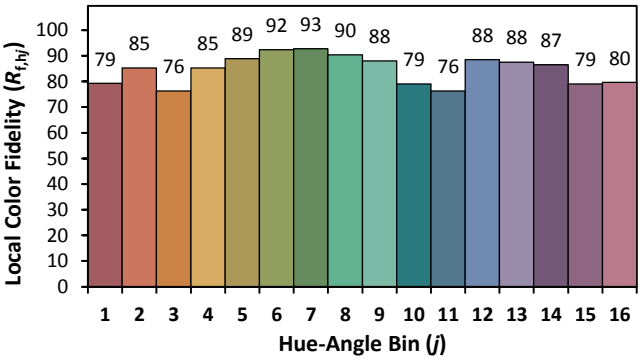


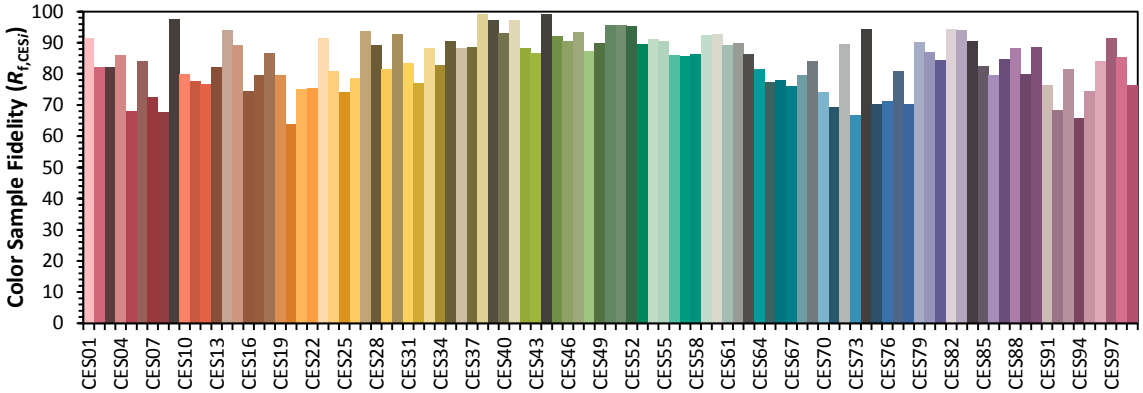

Reference
Test
Radiant Power
(Equal Luminous FLux)
380 430 480 530 580 630 680 730 780
Wavelength (nm)


Local Chroma Shift ($R_{cs,hj}$)
40% 30% 20% 10% 0% -10% -20% -30% -40%
-12% -8% -4% 2% 4% 5% -1% -5% -8% -6% 1% 5% 9% 5% 4% -6%

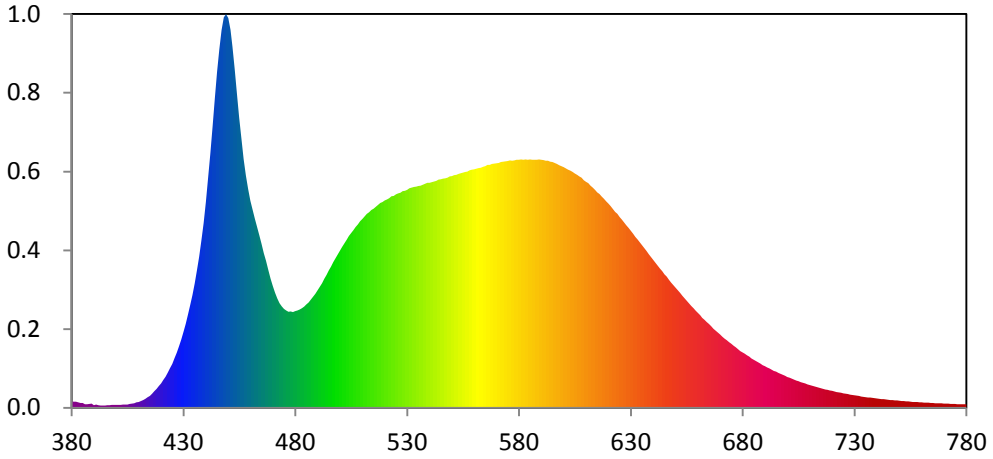

84
R_f
97
R_g
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
-20%
+20%


Local Hue Shift ($R_{hs,hj}$)
0.5 0.4 0.3 0.2 0.1 0.0 -0.1 -0.2 -0.3 -0.4 -0.5
-0.02 0.06 0.12 0.09 0.06 -0.01 -0.04 -0.03 0.03 0.11 0.15 0.06 -0.04 -0.05 -0.18 -0.11


Local Color Fidelity ($R_{f,hj}$)
100 90 80 70 60 50 40 30 20 10 0
79 85 76 85 89 92 93 90 88 79 76 88 88 87 79 80
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Hue-Angle Bin (j)


Color Sample Fidelity ($R_{f,CESi}$)
100 90 80 70 60 50 40 30 20 10 0
CES01 CES04 CES07 CES10 CES13 CES16 CES19 CES22 CES25 CES28 CES31 CES34 CES37 CES40 CES43 CES46 CES49 CES52 CES55 CES58 CES61 CES64 CES67 CES70 CES73 CES76 CES79 CES82 CES85 CES88 CES91 CES94 CES97

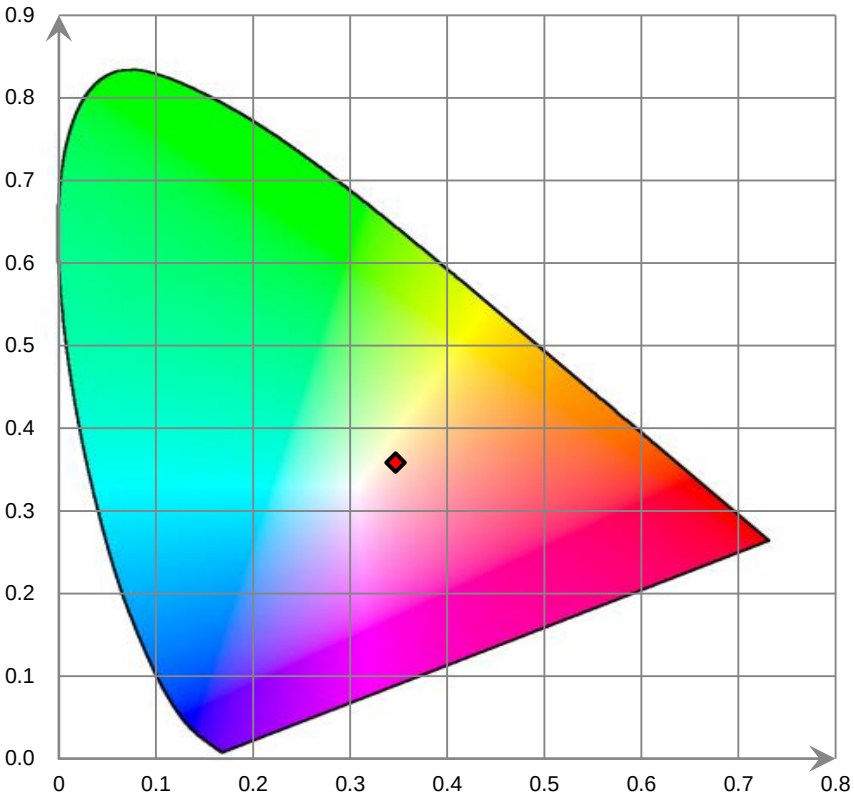
Relative Spectral Power Distribution



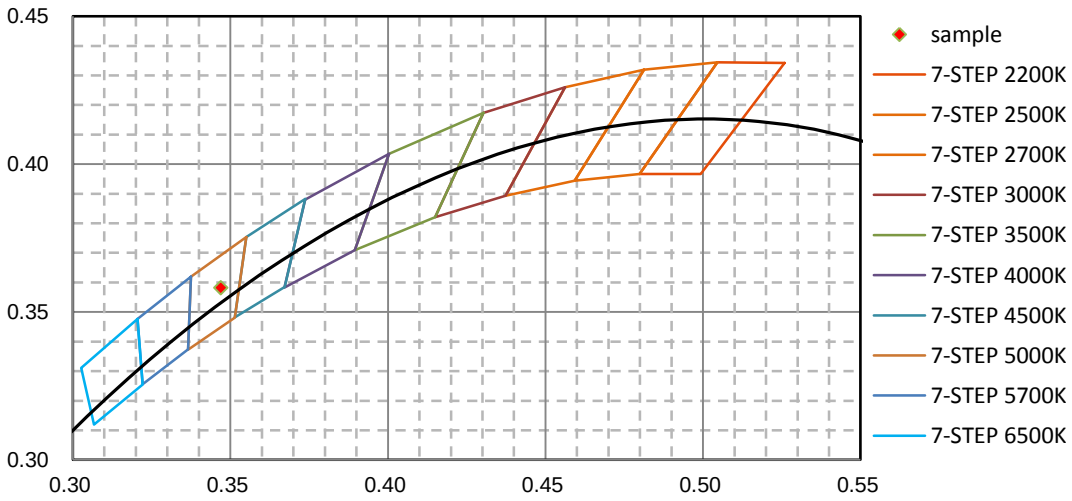
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.025E+00	421	8.764E+00	462	5.989E+01	503	5.324E+01	544	7.222E+01
381	1.886E+00	422	9.791E+00	463	5.727E+01	504	5.439E+01	545	7.231E+01
382	1.906E+00	423	1.115E+01	464	5.464E+01	505	5.536E+01	546	7.252E+01
383	1.721E+00	424	1.256E+01	465	5.187E+01	506	5.628E+01	547	7.270E+01
384	1.489E+00	425	1.388E+01	466	4.898E+01	507	5.721E+01	548	7.286E+01
385	1.520E+00	426	1.567E+01	467	4.649E+01	508	5.810E+01	549	7.324E+01
386	1.118E+00	427	1.742E+01	468	4.369E+01	509	5.908E+01	550	7.335E+01
387	1.066E+00	428	1.940E+01	469	4.089E+01	510	5.981E+01	551	7.365E+01
388	1.179E+00	429	2.162E+01	470	3.856E+01	511	6.064E+01	552	7.379E+01
389	1.256E+00	430	2.400E+01	471	3.644E+01	512	6.140E+01	553	7.409E+01
390	7.840E-01	431	2.656E+01	472	3.463E+01	513	6.191E+01	554	7.426E+01
391	1.006E+00	432	2.943E+01	473	3.318E+01	514	6.260E+01	555	7.450E+01
392	7.693E-01	433	3.256E+01	474	3.213E+01	515	6.308E+01	556	7.464E+01
393	7.308E-01	434	3.567E+01	475	3.132E+01	516	6.360E+01	557	7.476E+01
394	7.271E-01	435	3.927E+01	476	3.077E+01	517	6.422E+01	558	7.519E+01
395	7.516E-01	436	4.348E+01	477	3.034E+01	518	6.483E+01	559	7.542E+01
396	7.738E-01	437	4.780E+01	478	3.044E+01	519	6.515E+01	560	7.546E+01
397	8.530E-01	438	5.298E+01	479	3.033E+01	520	6.569E+01	561	7.572E+01
398	8.554E-01	439	5.844E+01	480	3.055E+01	521	6.598E+01	562	7.590E+01
399	9.218E-01	440	6.519E+01	481	3.076E+01	522	6.639E+01	563	7.604E+01
400	9.273E-01	441	7.281E+01	482	3.113E+01	523	6.698E+01	564	7.626E+01
401	8.943E-01	442	8.060E+01	483	3.155E+01	524	6.710E+01	565	7.647E+01
402	9.245E-01	443	8.907E+01	484	3.204E+01	525	6.758E+01	566	7.690E+01
403	9.728E-01	444	9.800E+01	485	3.271E+01	526	6.787E+01	567	7.696E+01
404	1.015E+00	445	1.064E+02	486	3.337E+01	527	6.812E+01	568	7.726E+01
405	1.003E+00	446	1.135E+02	487	3.421E+01	528	6.862E+01	569	7.728E+01
406	1.226E+00	447	1.196E+02	488	3.512E+01	529	6.872E+01	570	7.741E+01
407	1.340E+00	448	1.236E+02	489	3.610E+01	530	6.895E+01	571	7.756E+01
408	1.442E+00	449	1.246E+02	490	3.717E+01	531	6.948E+01	572	7.786E+01
409	1.669E+00	450	1.234E+02	491	3.828E+01	532	6.968E+01	573	7.797E+01
410	1.829E+00	451	1.196E+02	492	3.941E+01	533	6.990E+01	574	7.802E+01
411	2.095E+00	452	1.144E+02	493	4.083E+01	534	7.002E+01	575	7.810E+01
412	2.419E+00	453	1.074E+02	494	4.202E+01	535	7.025E+01	576	7.834E+01
413	2.845E+00	454	9.954E+01	495	4.345E+01	536	7.036E+01	577	7.827E+01
414	3.287E+00	455	9.193E+01	496	4.471E+01	537	7.065E+01	578	7.838E+01
415	3.759E+00	456	8.533E+01	497	4.610E+01	538	7.096E+01	579	7.850E+01
416	4.450E+00	457	7.873E+01	498	4.731E+01	539	7.126E+01	580	7.854E+01
417	5.226E+00	458	7.354E+01	499	4.852E+01	540	7.120E+01	581	7.862E+01
418	5.932E+00	459	6.933E+01	500	4.972E+01	541	7.146E+01	582	7.857E+01
419	6.892E+00	460	6.558E+01	501	5.100E+01	542	7.164E+01	583	7.860E+01
420	7.705E+00	461	6.269E+01	502	5.211E+01	543	7.184E+01	584	7.852E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	7.864E+01	626	5.956E+01	667	2.503E+01	708	7.648E+00	749	2.276E+00
586	7.851E+01	627	5.865E+01	668	2.442E+01	709	7.435E+00	750	2.193E+00
587	7.858E+01	628	5.780E+01	669	2.383E+01	710	7.196E+00	751	2.125E+00
588	7.853E+01	629	5.689E+01	670	2.316E+01	711	6.964E+00	752	2.073E+00
589	7.863E+01	630	5.607E+01	671	2.251E+01	712	6.807E+00	753	2.028E+00
590	7.853E+01	631	5.512E+01	672	2.193E+01	713	6.545E+00	754	1.980E+00
591	7.847E+01	632	5.406E+01	673	2.140E+01	714	6.376E+00	755	1.911E+00
592	7.819E+01	633	5.333E+01	674	2.078E+01	715	6.183E+00	756	1.864E+00
593	7.826E+01	634	5.238E+01	675	2.023E+01	716	5.980E+00	757	1.840E+00
594	7.793E+01	635	5.147E+01	676	1.961E+01	717	5.805E+00	758	1.770E+00
595	7.779E+01	636	5.053E+01	677	1.913E+01	718	5.651E+00	759	1.743E+00
596	7.748E+01	637	4.960E+01	678	1.858E+01	719	5.489E+00	760	1.668E+00
597	7.718E+01	638	4.863E+01	679	1.797E+01	720	5.347E+00	761	1.625E+00
598	7.686E+01	639	4.775E+01	680	1.751E+01	721	5.177E+00	762	1.618E+00
599	7.655E+01	640	4.686E+01	681	1.707E+01	722	4.995E+00	763	1.571E+00
600	7.624E+01	641	4.590E+01	682	1.660E+01	723	4.881E+00	764	1.515E+00
601	7.582E+01	642	4.497E+01	683	1.617E+01	724	4.728E+00	765	1.484E+00
602	7.537E+01	643	4.409E+01	684	1.564E+01	725	4.583E+00	766	1.427E+00
603	7.507E+01	644	4.323E+01	685	1.520E+01	726	4.439E+00	767	1.409E+00
604	7.469E+01	645	4.225E+01	686	1.474E+01	727	4.337E+00	768	1.389E+00
605	7.420E+01	646	4.150E+01	687	1.433E+01	728	4.197E+00	769	1.369E+00
606	7.380E+01	647	4.055E+01	688	1.397E+01	729	4.033E+00	770	1.313E+00
607	7.326E+01	648	3.959E+01	689	1.349E+01	730	3.943E+00	771	1.286E+00
608	7.283E+01	649	3.878E+01	690	1.318E+01	731	3.818E+00	772	1.256E+00
609	7.208E+01	650	3.795E+01	691	1.278E+01	732	3.712E+00	773	1.223E+00
610	7.159E+01	651	3.717E+01	692	1.243E+01	733	3.585E+00	774	1.190E+00
611	7.112E+01	652	3.634E+01	693	1.209E+01	734	3.482E+00	775	1.164E+00
612	7.033E+01	653	3.546E+01	694	1.169E+01	735	3.361E+00	776	1.140E+00
613	6.975E+01	654	3.461E+01	695	1.140E+01	736	3.282E+00	777	1.108E+00
614	6.904E+01	655	3.380E+01	696	1.100E+01	737	3.196E+00	778	1.083E+00
615	6.824E+01	656	3.301E+01	697	1.068E+01	738	3.093E+00	779	1.065E+00
616	6.774E+01	657	3.219E+01	698	1.043E+01	739	3.014E+00	780	1.067E+00
617	6.685E+01	658	3.150E+01	699	1.010E+01	740	2.890E+00		
618	6.614E+01	659	3.073E+01	700	9.765E+00	741	2.834E+00		
619	6.535E+01	660	2.998E+01	701	9.483E+00	742	2.755E+00		
620	6.460E+01	661	2.929E+01	702	9.231E+00	743	2.679E+00		
621	6.384E+01	662	2.851E+01	703	8.901E+00	744	2.583E+00		
622	6.297E+01	663	2.786E+01	704	8.644E+00	745	2.521E+00		
623	6.206E+01	664	2.716E+01	705	8.381E+00	746	2.473E+00		
624	6.139E+01	665	2.651E+01	706	8.130E+00	747	2.403E+00		
625	6.042E+01	666	2.582E+01	707	7.892E+00	748	2.337E+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**

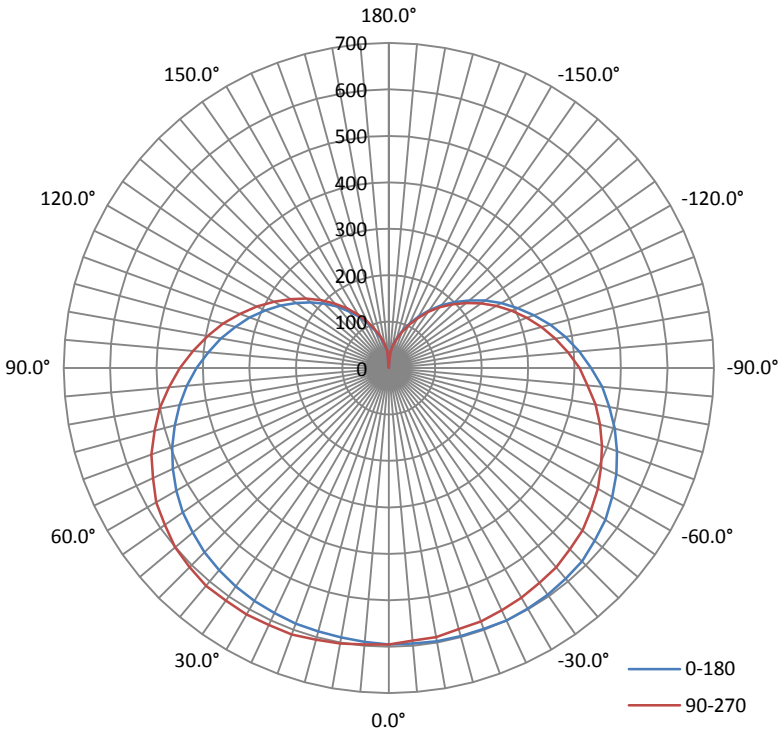
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.2832	33.91	0.9979

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
5023.2	148.12	615.4	1.53	1.46

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	230.1	231.2	227.8	227.2	229.1
Field Angle (10% I_{max}):	334.2	334.5	333.6	333.5	334.0

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	595	595	595	595	595	595	595	595
5.0°	592	594	597	599	597	600	602	597
10.0°	589	594	600	603	602	603	603	600
15.0°	587	595	599	604	605	607	609	602
20.0°	586	593	602	609	611	610	609	604
25.0°	582	593	599	608	611	614	612	605
30.0°	579	589	601	609	613	614	612	605
35.0°	574	587	598	610	611	614	613	604
40.0°	568	582	596	607	612	612	609	600
45.0°	561	576	590	603	606	608	604	595
50.0°	551	567	583	597	601	600	596	588
55.0°	541	557	572	585	588	589	588	577
60.0°	528	543	560	573	578	577	573	565
65.0°	513	528	542	557	560	562	560	551
70.0°	496	512	528	539	544	543	540	533
75.0°	477	493	506	519	522	522	522	513
80.0°	458	472	485	497	501	500	499	491
85.0°	436	450	461	473	475	476	475	468
90.0°	414	426	439	448	450	452	449	444
95.0°	390	402	413	421	423	424	424	418
100.0°	367	377	387	394	396	397	398	393
105.0°	342	352	361	367	370	370	371	366
110.0°	319	326	334	339	340	342	343	338
115.0°	293	300	306	312	314	315	315	313
120.0°	269	274	280	285	285	287	287	285
125.0°	244	249	253	258	259	260	260	258
130.0°	220	224	228	231	232	233	234	231
135.0°	196	199	203	205	207	207	208	206
140.0°	173	176	179	181	181	182	183	181
145.0°	149	152	155	156	157	157	157	156
150.0°	127	129	132	133	133	134	134	133
155.0°	106	107	110	111	111	111	112	111
160.0°	86	87	89	90	90	90	91	90
165.0°	68	68	70	71	71	71	71	71
170.0°	51	51	53	54	54	54	54	54
175.0°	36	36	36	38	37	37	38	37
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

C / γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	595	595	595	595	595	595	595	595
5.0°	595	596	594	592	589	592	596	593
10.0°	598	596	592	589	589	587	588	589
15.0°	598	594	590	588	582	582	585	585
20.0°	598	593	589	583	581	577	581	581
25.0°	600	594	586	580	576	572	576	575
30.0°	598	591	585	577	571	569	570	571
35.0°	597	589	579	574	565	563	566	566
40.0°	592	585	576	568	560	555	557	558
45.0°	589	579	568	560	551	547	549	550
50.0°	578	571	561	554	544	540	539	541
55.0°	569	560	550	542	532	527	528	529
60.0°	555	548	538	529	520	514	515	515
65.0°	541	533	524	515	504	500	500	501
70.0°	523	517	508	499	489	484	483	484
75.0°	504	498	488	482	471	465	464	465
80.0°	482	477	470	461	452	446	445	445
85.0°	461	455	448	441	430	426	425	425
90.0°	436	431	425	418	411	405	404	403
95.0°	412	407	403	396	388	383	381	380
100.0°	386	383	377	371	364	360	359	357
105.0°	360	356	352	347	341	337	335	334
110.0°	332	331	327	323	316	313	311	309
115.0°	306	305	301	298	292	288	288	286
120.0°	280	278	276	273	267	265	263	262
125.0°	254	252	250	246	243	240	240	238
130.0°	227	226	225	221	218	216	216	214
135.0°	201	201	200	197	194	192	192	190
140.0°	176	176	175	173	171	169	168	167
145.0°	152	152	151	149	147	146	145	144
150.0°	128	128	127	125	124	123	122	122
155.0°	106	106	105	104	103	102	102	101
160.0°	85	85	85	84	83	82	82	81
165.0°	66	66	66	65	64	64	64	63
170.0°	50	50	49	48	48	48	48	48
175.0°	33	34	33	32	31	31	32	31
180.0°	1	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	14.2	0.28
5-10	42.6	0.85
10-15	70.6	1.41
15-20	98.0	1.95
20-25	124.5	2.48
25-30	149.8	2.98
30-35	173.7	3.45
35-40	195.6	3.90
40-45	215.0	4.28
45-50	231.8	4.61
50-55	245.3	4.89
55-60	255.4	5.08
60-65	261.7	5.21
65-70	264.6	5.27
70-75	263.6	5.25
75-80	259.1	5.15
80-85	251.5	5.01
85-90	241.0	4.80
90-95	228.0	4.54
95-100	212.9	4.24
100-105	196.1	3.90
105-110	178.1	3.55
110-115	159.5	3.17
115-120	140.6	2.80
120-125	121.7	2.42
125-130	103.4	2.06
130-135	85.9	1.71
135-140	69.6	1.39
140-145	54.7	1.08
145-150	41.3	0.83
150-155	29.8	0.59
155-160	20.3	0.40
160-165	12.7	0.26
165-170	7.1	0.14
170-175	3.1	0.06
175-180	0.5	0.01

Deg	Flux (lm)	%
0-5	14.2	0.28
0-10	56.8	1.13
0-15	127.4	2.54
0-20	225.4	4.49
0-25	349.9	6.97
0-30	499.7	9.95
0-35	673.3	13.40
0-40	869.0	17.30
0-45	1084.0	21.58
0-50	1315.8	26.19
0-55	1561.1	31.08
0-60	1816.5	36.16
0-65	2078.2	41.37
0-70	2342.8	46.64
0-75	2606.3	51.89
0-80	2865.5	57.04
0-85	3117.0	62.05
0-90	3358.0	66.85
0-95	3586.0	71.39
0-100	3798.9	75.63
0-105	3995.0	79.53
0-110	4173.1	83.08
0-115	4332.7	86.25
0-120	4473.2	89.05
0-125	4594.9	91.47
0-130	4698.3	93.53
0-135	4784.2	95.24
0-140	4853.7	96.63
0-145	4908.4	97.71
0-150	4949.7	98.54
0-155	4979.5	99.13
0-160	4999.8	99.53
0-165	5012.5	99.79
0-170	5019.5	99.93
0-175	5022.7	99.99
0-180	5023.2	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**********