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: 7MR16DIM/930SP15/RC

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Reviewed By:	George Chen
Report Number:	KS2211025-54684E-10
Test Date:	2021-07-15 to 2021-07-21
Report Date:	2021-11-16
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 samples were received on 2021-07-06. One was tested in integrating sphere and the other was tested in goniophotometer.

Model Tested:	7MR16DIM/930SP15/RC
Manufacturer:	GREEN CREATIVE LTD
Brand Name:	GREEN CREATIVE
Product Designation:	Directional LED Lamp
Burning Time Before Test:	0hour(For New Products)

Rated Values:

Rated Voltage/Frequency:	12 VAC 60Hz
Rated Power:	7W
Nominal CCT:	3000K
Nominal Lumen Output:	500lm

Note:

1. The applicant GREEN CREATIVE LTD declare that their products with model 7MR16DIM/930SP15/RC are the sa me to the products in report#KS2210706-27578E-10 and is authorized by original applicant to use their test data.
2. All the data in previous report (KS2210706-27578E-10) is shared in this report.

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 (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	2020-10-21	2021-10-20
spectroradiometer	EVERFINE	HAAS-2000	G112048TS81331121	2020-10-21	2021-10-20
Digital Power Meter	EVERFINE	PF2010A	1011004	2020-10-21	2021-10-20
Digital CC&CV DC Power Supply	EVERFINE	WY305-V1	1101047	2021-06-30	2022-06-29
Rapid Recording Photometer	EVERFINE	PHOTO-2000F	1007010	2020-11-05	2021-11-04
Standard Light Source	EVERFINE	D204	N/A	2020-10-20	2021-10-19
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

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
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 Sensor	N/A	433MHz	N/A	2021-03-12	2022-03-11
Standard Light Source	EVERFINE	D908	1012003	2020-10-20	2021-10-19

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**

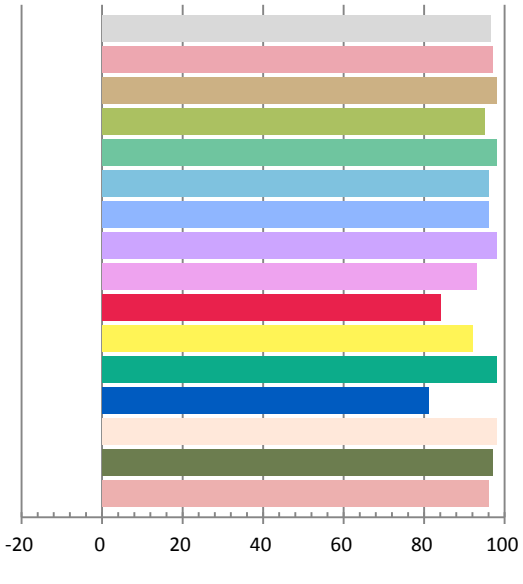
Photometric and Electrical Measurement Result

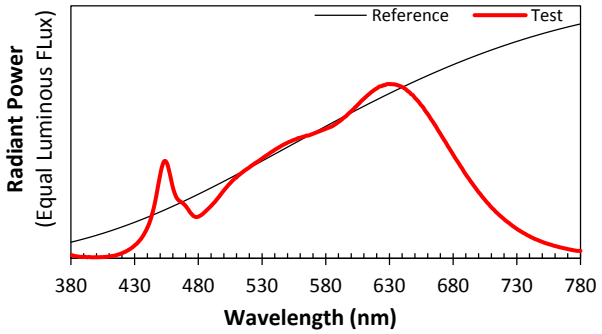
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
12.0	60	0.5787	6.305	0.9080	554.39	87.92

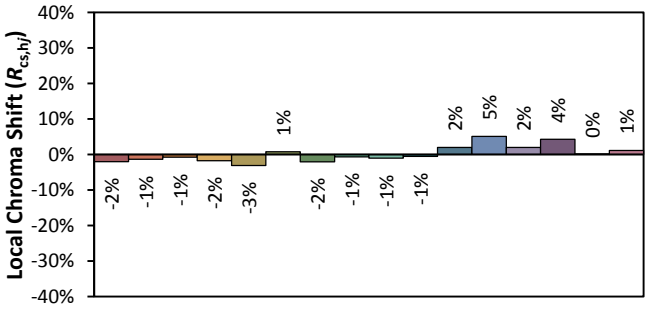
Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
2.0062	3099	0.000704	0.4311	0.4037	0.2469	0.5204

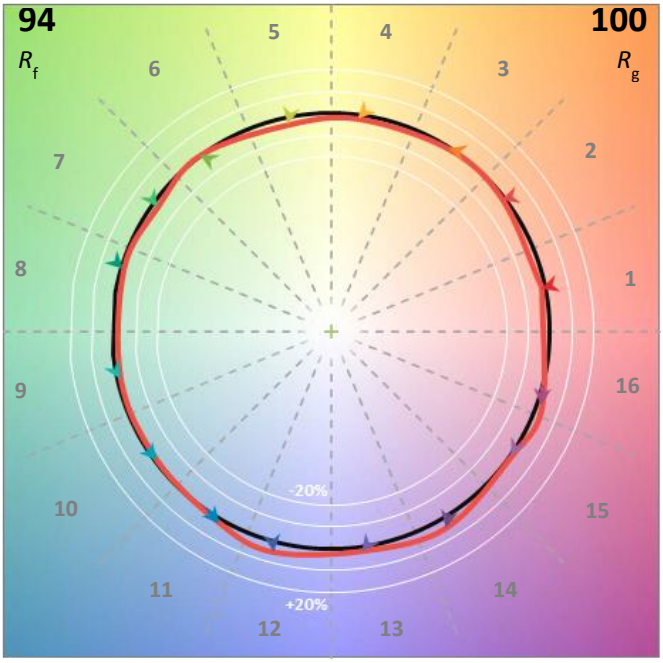
Color Rendering Index

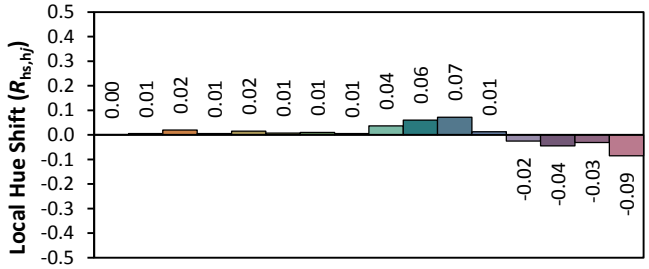
Ra			
96.5			
R1	R2	R3	R4
97	98	95	98
R5	R6	R7	R8
96	96	98	93
R9	R10	R11	R12
84	92	98	81
R13	R14	R15	
98	97	96	

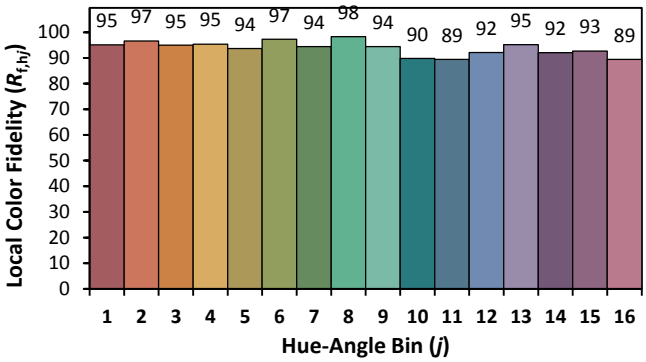


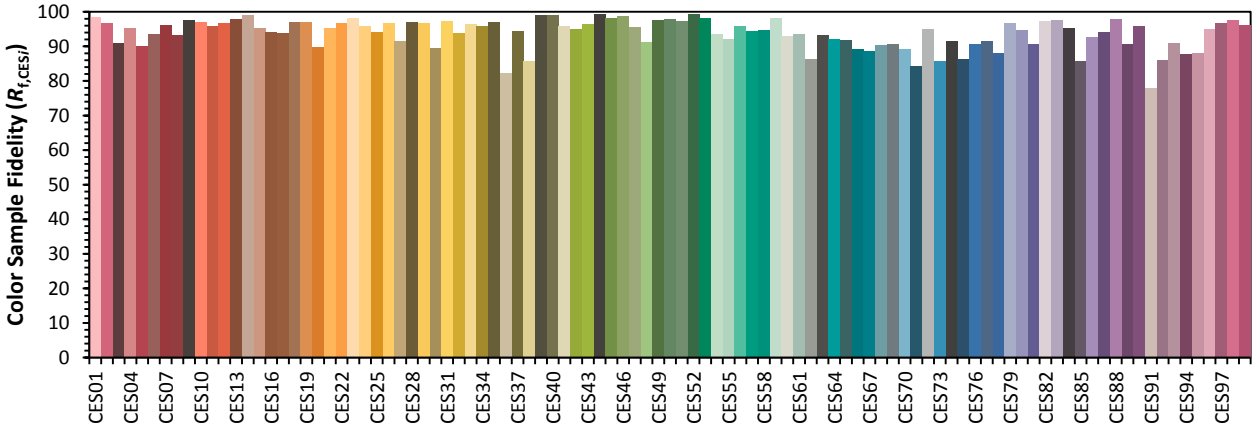

Reference
Test
Radiant Power
(Equal Luminous FLux)
380 430 480 530 580 630 680 730 780
Wavelength (nm)


Local Chroma Shift ($R_{cs,hj}$)
40% 30% 20% 10% 0% -10% -20% -30% -40%
-2% -1% -1% -2% -3% 1% -2% -1% -1% -1% 2% 5% 2% 4% 0% 1%

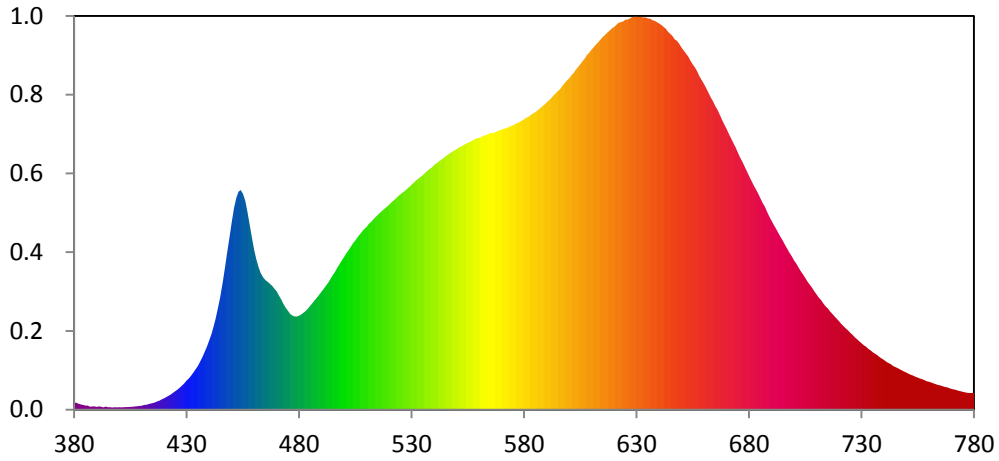

94
R_f
100
R_g
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
-20%
+20%


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
0.00 0.01 0.02 0.01 0.02 0.01 0.01 0.01 0.04 0.06 0.07 0.01 -0.02 -0.04 -0.03 -0.09


Local Color Fidelity ($R_{f,hj}$)
100 90 80 70 60 50 40 30 20 10 0
95 97 95 95 94 97 94 98 94 90 89 92 95 92 93 89
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

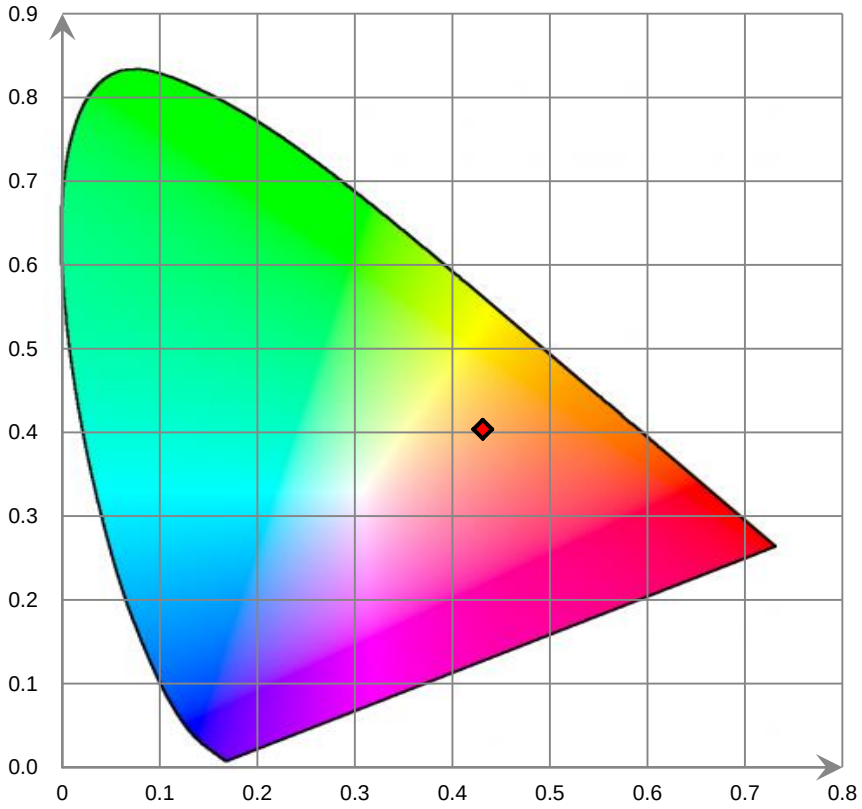
Relative Spectral Power Distribution



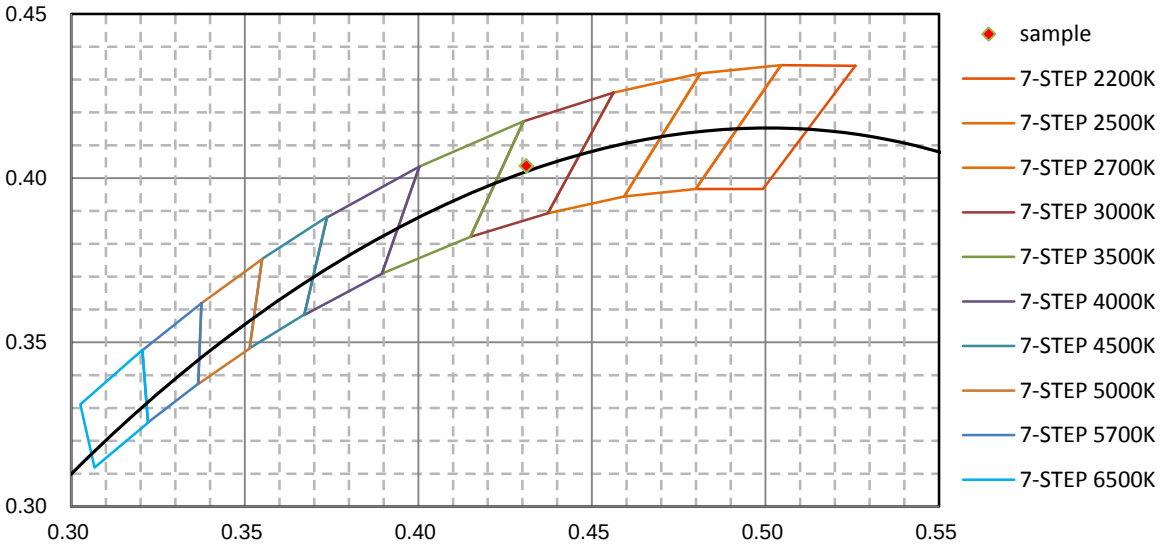
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.995E-01	421	3.656E-01	462	4.063E+00	503	4.656E+00	544	7.171E+00
381	1.985E-01	422	4.014E-01	463	3.887E+00	504	4.752E+00	545	7.223E+00
382	1.683E-01	423	4.397E-01	464	3.778E+00	505	4.832E+00	546	7.274E+00
383	1.478E-01	424	4.857E-01	465	3.700E+00	506	4.923E+00	547	7.309E+00
384	1.380E-01	425	5.322E-01	466	3.648E+00	507	5.008E+00	548	7.359E+00
385	1.184E-01	426	5.810E-01	467	3.588E+00	508	5.085E+00	549	7.392E+00
386	1.170E-01	427	6.338E-01	468	3.532E+00	509	5.160E+00	550	7.438E+00
387	8.547E-02	428	6.933E-01	469	3.450E+00	510	5.208E+00	551	7.478E+00
388	9.574E-02	429	7.583E-01	470	3.375E+00	511	5.305E+00	552	7.510E+00
389	9.711E-02	430	8.325E-01	471	3.260E+00	512	5.356E+00	553	7.542E+00
390	8.161E-02	431	8.949E-01	472	3.149E+00	513	5.431E+00	554	7.584E+00
391	9.672E-02	432	9.714E-01	473	3.017E+00	514	5.496E+00	555	7.617E+00
392	8.431E-02	433	1.065E+00	474	2.910E+00	515	5.556E+00	556	7.640E+00
393	6.790E-02	434	1.157E+00	475	2.824E+00	516	5.625E+00	557	7.675E+00
394	9.147E-02	435	1.255E+00	476	2.733E+00	517	5.680E+00	558	7.718E+00
395	7.253E-02	436	1.379E+00	477	2.687E+00	518	5.739E+00	559	7.744E+00
396	7.304E-02	437	1.504E+00	478	2.658E+00	519	5.791E+00	560	7.751E+00
397	6.245E-02	438	1.651E+00	479	2.659E+00	520	5.847E+00	561	7.782E+00
398	7.218E-02	439	1.801E+00	480	2.681E+00	521	5.913E+00	562	7.814E+00
399	6.722E-02	440	1.974E+00	481	2.721E+00	522	5.971E+00	563	7.831E+00
400	7.048E-02	441	2.154E+00	482	2.768E+00	523	6.026E+00	564	7.863E+00
401	6.783E-02	442	2.382E+00	483	2.825E+00	524	6.090E+00	565	7.895E+00
402	7.268E-02	443	2.632E+00	484	2.898E+00	525	6.142E+00	566	7.892E+00
403	7.856E-02	444	2.929E+00	485	2.975E+00	526	6.196E+00	567	7.910E+00
404	7.672E-02	445	3.244E+00	486	3.053E+00	527	6.243E+00	568	7.944E+00
405	7.994E-02	446	3.618E+00	487	3.131E+00	528	6.300E+00	569	7.967E+00
406	8.776E-02	447	4.032E+00	488	3.206E+00	529	6.356E+00	570	7.995E+00
407	9.370E-02	448	4.481E+00	489	3.289E+00	530	6.420E+00	571	8.015E+00
408	1.010E-01	449	4.919E+00	490	3.371E+00	531	6.476E+00	572	8.024E+00
409	1.074E-01	450	5.353E+00	491	3.457E+00	532	6.539E+00	573	8.059E+00
410	1.136E-01	451	5.748E+00	492	3.547E+00	533	6.595E+00	574	8.085E+00
411	1.341E-01	452	6.030E+00	493	3.632E+00	534	6.644E+00	575	8.109E+00
412	1.411E-01	453	6.221E+00	494	3.736E+00	535	6.695E+00	576	8.148E+00
413	1.588E-01	454	6.263E+00	495	3.841E+00	536	6.758E+00	577	8.175E+00
414	1.747E-01	455	6.162E+00	496	3.936E+00	537	6.817E+00	578	8.209E+00
415	1.917E-01	456	5.969E+00	497	4.049E+00	538	6.869E+00	579	8.244E+00
416	2.139E-01	457	5.644E+00	498	4.152E+00	539	6.914E+00	580	8.283E+00
417	2.419E-01	458	5.286E+00	499	4.265E+00	540	6.980E+00	581	8.330E+00
418	2.650E-01	459	4.908E+00	500	4.360E+00	541	7.027E+00	582	8.359E+00
419	3.027E-01	460	4.557E+00	501	4.466E+00	542	7.077E+00	583	8.409E+00
420	3.280E-01	461	4.285E+00	502	4.556E+00	543	7.125E+00	584	8.456E+00

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	8.492E+00	626	1.113E+01	667	8.408E+00	708	3.482E+00	749	1.087E+00
586	8.539E+00	627	1.116E+01	668	8.264E+00	709	3.374E+00	750	1.058E+00
587	8.593E+00	628	1.120E+01	669	8.133E+00	710	3.287E+00	751	1.023E+00
588	8.650E+00	629	1.121E+01	670	8.008E+00	711	3.198E+00	752	9.929E-01
589	8.704E+00	630	1.121E+01	671	7.864E+00	712	3.130E+00	753	9.707E-01
590	8.766E+00	631	1.120E+01	672	7.737E+00	713	3.036E+00	754	9.376E-01
591	8.821E+00	632	1.120E+01	673	7.606E+00	714	2.950E+00	755	9.182E-01
592	8.885E+00	633	1.119E+01	674	7.482E+00	715	2.886E+00	756	8.911E-01
593	8.957E+00	634	1.119E+01	675	7.340E+00	716	2.800E+00	757	8.732E-01
594	9.026E+00	635	1.116E+01	676	7.197E+00	717	2.733E+00	758	8.420E-01
595	9.087E+00	636	1.115E+01	677	7.075E+00	718	2.659E+00	759	8.120E-01
596	9.147E+00	637	1.111E+01	678	6.940E+00	719	2.590E+00	760	7.988E-01
597	9.237E+00	638	1.109E+01	679	6.811E+00	720	2.520E+00	761	7.737E-01
598	9.313E+00	639	1.105E+01	680	6.670E+00	721	2.442E+00	762	7.509E-01
599	9.390E+00	640	1.102E+01	681	6.538E+00	722	2.381E+00	763	7.274E-01
600	9.454E+00	641	1.097E+01	682	6.403E+00	723	2.318E+00	764	7.065E-01
601	9.539E+00	642	1.092E+01	683	6.286E+00	724	2.264E+00	765	6.921E-01
602	9.606E+00	643	1.086E+01	684	6.163E+00	725	2.195E+00	766	6.684E-01
603	9.708E+00	644	1.078E+01	685	6.031E+00	726	2.133E+00	767	6.519E-01
604	9.774E+00	645	1.072E+01	686	5.902E+00	727	2.065E+00	768	6.363E-01
605	9.863E+00	646	1.066E+01	687	5.788E+00	728	2.013E+00	769	6.171E-01
606	9.944E+00	647	1.056E+01	688	5.643E+00	729	1.952E+00	770	5.944E-01
607	1.003E+01	648	1.052E+01	689	5.508E+00	730	1.896E+00	771	5.785E-01
608	1.012E+01	649	1.043E+01	690	5.389E+00	731	1.837E+00	772	5.645E-01
609	1.019E+01	650	1.032E+01	691	5.269E+00	732	1.798E+00	773	5.419E-01
610	1.027E+01	651	1.024E+01	692	5.163E+00	733	1.735E+00	774	5.292E-01
611	1.034E+01	652	1.015E+01	693	5.041E+00	734	1.692E+00	775	5.105E-01
612	1.042E+01	653	1.006E+01	694	4.926E+00	735	1.638E+00	776	4.992E-01
613	1.049E+01	654	9.949E+00	695	4.821E+00	736	1.595E+00	777	4.843E-01
614	1.056E+01	655	9.841E+00	696	4.697E+00	737	1.554E+00	778	4.794E-01
615	1.063E+01	656	9.756E+00	697	4.591E+00	738	1.500E+00	779	4.800E-01
616	1.070E+01	657	9.641E+00	698	4.476E+00	739	1.460E+00	780	4.806E-01
617	1.076E+01	658	9.503E+00	699	4.370E+00	740	1.420E+00		
618	1.082E+01	659	9.395E+00	700	4.252E+00	741	1.369E+00		
619	1.088E+01	660	9.287E+00	701	4.166E+00	742	1.332E+00		
620	1.092E+01	661	9.168E+00	702	4.052E+00	743	1.298E+00		
621	1.098E+01	662	9.033E+00	703	3.949E+00	744	1.249E+00		
622	1.104E+01	663	8.905E+00	704	3.856E+00	745	1.219E+00		
623	1.106E+01	664	8.798E+00	705	3.753E+00	746	1.191E+00		
624	1.107E+01	665	8.662E+00	706	3.651E+00	747	1.153E+00		
625	1.113E+01	666	8.545E+00	707	3.562E+00	748	1.123E+00		

CIE 1931xy Chromaticity Diagram



7-StepChromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Base Up**

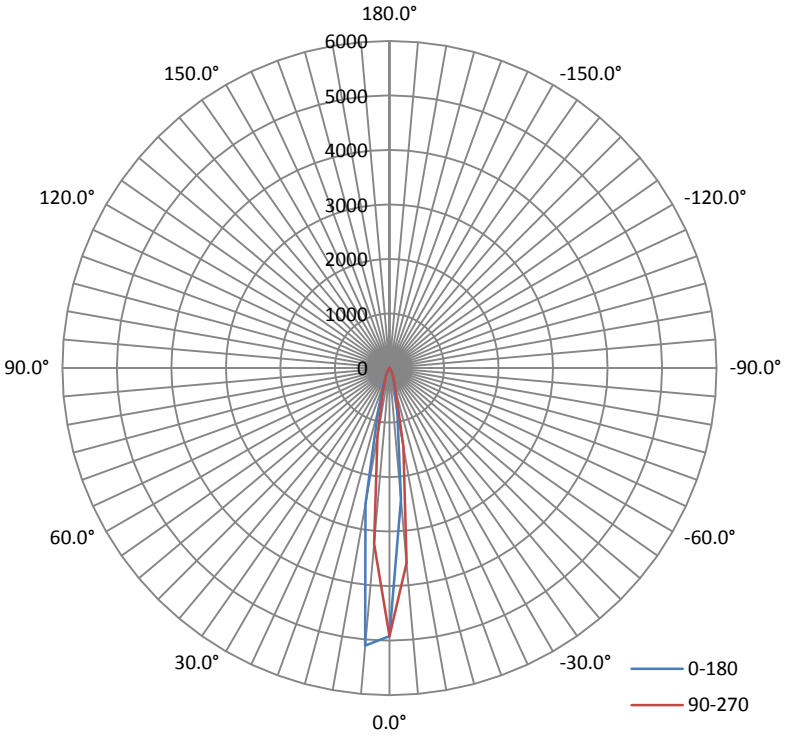
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
12.01	60	0.5627	6.301	0.9326

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	I_{max}(cd)	S/MH(C0/180)	S/MH(C90/270)
559.089	88.73	5587.0	0.17	0.26

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50%I_{max}):	13.6	13.9	14.1	13.6	13.8
Field Angle(10%I_{max}):	28.6	29.1	29.3	28.4	28.9

Luminous Intensity (cd) Distribution Data

C / γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	4918	4918	4918	4918	4918	4918	4918	4918
5.0°	5110	4762	4251	3714	3236	2865	2609	2481
10.0°	2533	2310	1974	1575	1267	1055	926	866
15.0°	796	734	638	555	473	396	361	340
20.0°	305	296	277	254	236	219	207	200
25.0°	182	181	172	160	147	137	130	125
30.0°	112	113	105	95	84	77	74	70
35.0°	61	62	57	51	43	38	36	34
40.0°	29	29	27	24	22	19	18	17
45.0°	17	16	16	15	13	13	12	11
50.0°	12	12	11	11	10	9	9	9
55.0°	9	9	9	9	8	7	7	7
60.0°	7	7	7	7	6	6	6	6
65.0°	6	7	6	5	5	5	5	4
70.0°	5	5	4	4	4	5	4	3
75.0°	4	4	3	3	3	3	3	2
80.0°	2	3	2	2	2	2	2	1
85.0°	1	2	1	1	1	1	1	1
90.0°	1	1	1	1	1	1	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	1	1	1	0
105.0°	1	2	1	0	1	1	1	0
110.0°	1	1	1	0	1	1	0	0
115.0°	1	1	0	0	0	0	1	0
120.0°	2	2	1	0	2	1	0	0
125.0°	1	1	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	1	1	1	1
145.0°	1	1	1	1	1	1	1	1
150.0°	1	1	1	1	2	2	2	2
155.0°	2	2	2	2	2	2	2	2
160.0°	2	2	2	2	2	2	2	2
165.0°	2	2	2	2	2	2	2	2
170.0°	2	2	2	2	1	1	1	1
175.0°	1	1	1	1	1	1	1	1
180.0°	1	1	1	1	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°	4918	4918	4918	4918	4918	4918	4918	4918
5.0°	2412	2530	2763	3129	3589	4088	4580	4864
10.0°	831	863	955	1197	1464	1737	2065	2287
15.0°	336	340	357	390	449	533	622	695
20.0°	198	200	207	219	234	251	266	277
25.0°	125	125	130	139	149	157	163	169
30.0°	68	68	71	79	87	92	97	100
35.0°	32	32	34	39	44	46	51	52
40.0°	17	16	17	19	21	23	24	26
45.0°	11	11	12	13	14	15	15	15
50.0°	9	9	9	10	10	11	11	11
55.0°	7	7	7	8	8	9	9	9
60.0°	6	6	6	6	6	7	7	7
65.0°	5	5	5	5	5	6	6	6
70.0°	4	4	4	4	4	5	4	4
75.0°	2	3	3	3	3	4	3	3
80.0°	2	2	2	2	2	2	2	2
85.0°	1	1	1	1	1	1	1	1
90.0°	0	1	0	1	1	1	1	1
95.0°	0	0	0	0	0	0	0	0
100.0°	1	1	1	0	1	0	0	0
105.0°	1	1	1	0	1	1	1	0
110.0°	0	0	1	0	1	0	0	0
115.0°	2	1	2	0	0	0	0	0
120.0°	0	0	2	0	2	2	3	0
125.0°	0	0	0	0	0	0	1	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	1	1
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°	1	1	1	1	1	1	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	100.4	17.97
5-10	168.3	30.09
10-15	104.4	18.67
15-20	55.7	9.97
20-25	39.8	7.11
25-30	29.3	5.25
30-35	18.7	3.35
35-40	10.5	1.87
40-45	6.3	1.13
45-50	4.7	0.85
50-55	3.9	0.70
55-60	3.3	0.60
60-65	2.9	0.52
65-70	2.4	0.42
70-75	1.9	0.34
75-80	1.3	0.24
80-85	0.8	0.14
85-90	0.5	0.09
90-95	0.3	0.04
95-100	0.2	0.04
100-105	0.3	0.07
105-110	0.3	0.05
110-115	0.2	0.05
115-120	0.5	0.09
120-125	0.4	0.07
125-130	0.1	0.01
130-135	0.1	0.02
135-140	0.1	0.01
140-145	0.2	0.03
145-150	0.2	0.04
150-155	0.3	0.05
155-160	0.3	0.05
160-165	0.2	0.03
165-170	0.1	0.03
170-175	0.1	0.01
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	100.4	17.97
0-10	268.7	48.06
0-15	373.1	66.73
0-20	428.8	76.70
0-25	468.6	83.81
0-30	497.9	89.06
0-35	516.6	92.41
0-40	527.1	94.28
0-45	533.4	95.41
0-50	538.2	96.26
0-55	542.1	96.96
0-60	545.4	97.56
0-65	548.3	98.08
0-70	550.7	98.50
0-75	552.6	98.84
0-80	553.9	99.08
0-85	554.8	99.22
0-90	555.2	99.31
0-95	555.5	99.35
0-100	555.7	99.39
0-105	556.1	99.46
0-110	556.4	99.51
0-115	556.6	99.56
0-120	557.1	99.65
0-125	557.5	99.72
0-130	557.6	99.73
0-135	557.7	99.75
0-140	557.8	99.76
0-145	557.9	99.79
0-150	558.2	99.83
0-155	558.4	99.88
0-160	558.7	99.93
0-165	558.9	99.96
0-170	559.0	99.99
0-175	559.1	100.00
0-180	559.1	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**********