



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/850/277V/E26/DIM

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Reviewed By:	George Chen <i>George Chen</i>
Report Number:	KS2210909-47103E-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 1 st 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: 24HID/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: 120-277VAC 50/60Hz
Rated Power: 24W
Nominal CCT: 5000K
Nominal Lumen Output: 3200lm

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.

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 $U=21\text{K}$ ($K=2$), 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 (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_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**

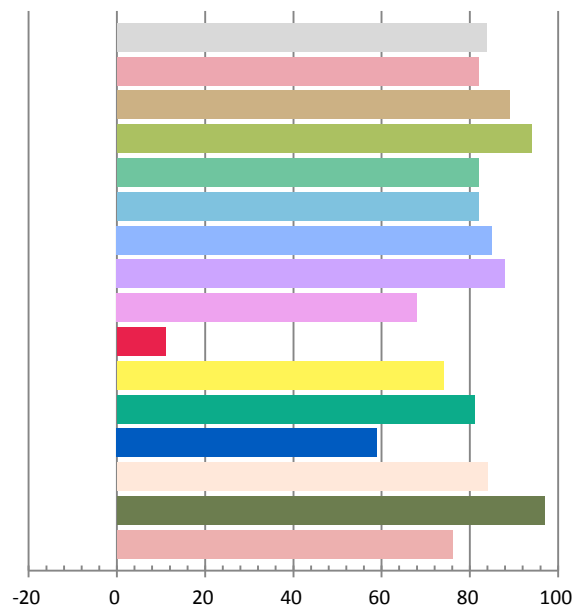
Photometric and Electrical Measurement Result

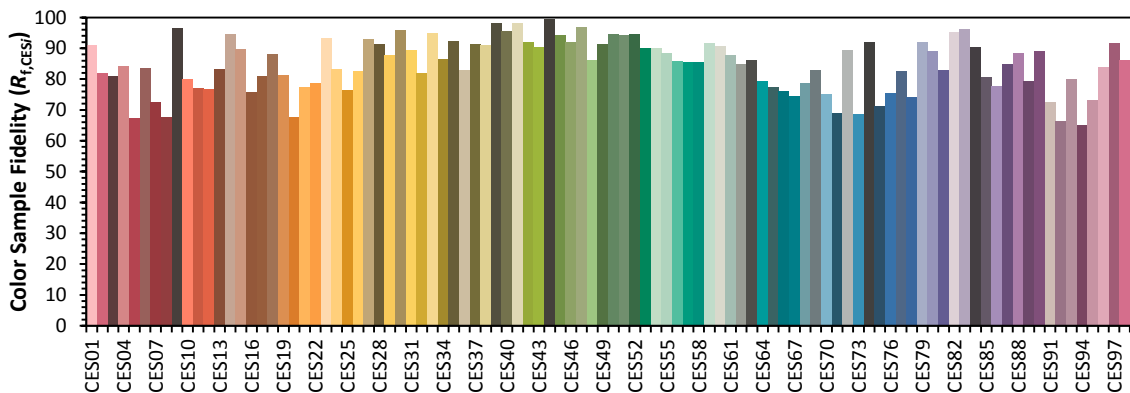
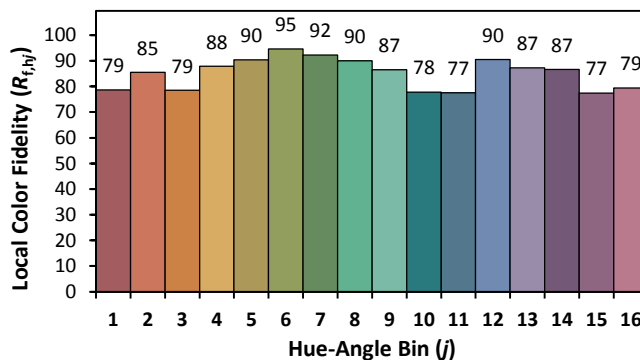
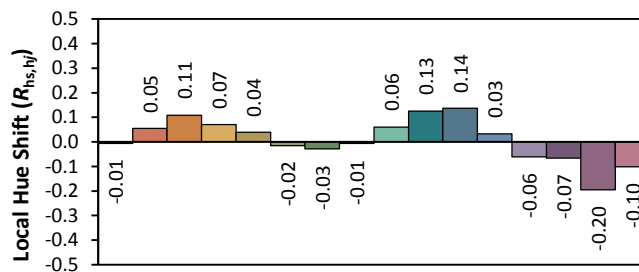
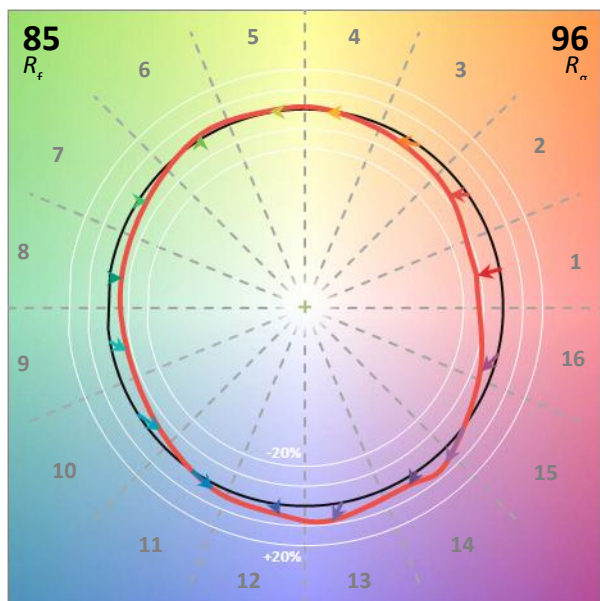
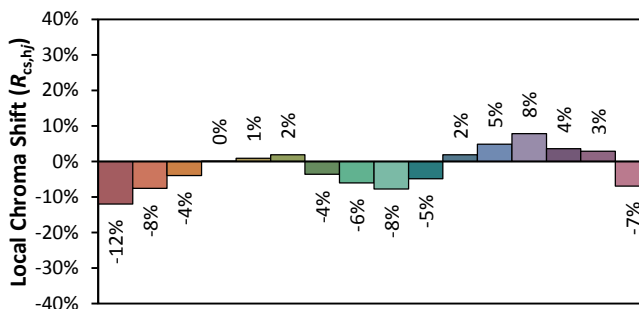
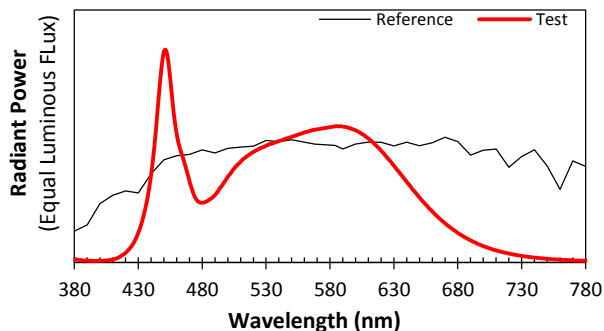
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
119.9	60	0.1958	23.35	0.9944	3237.2	138.62

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.071	4922	0.00281	0.3479	0.3595	0.2103	0.4889

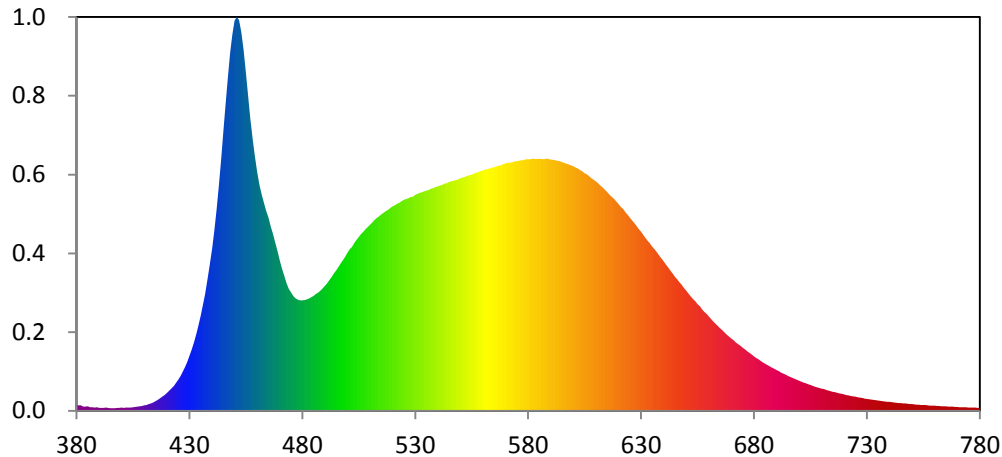
Color Rendering Index

Ra			
83.8			
R1	R2	R3	R4
82	89	94	82
R5	R6	R7	R8
82	85	88	68
R9	R10	R11	R12
11	74	81	59
R13	R14	R15	
84	97	76	





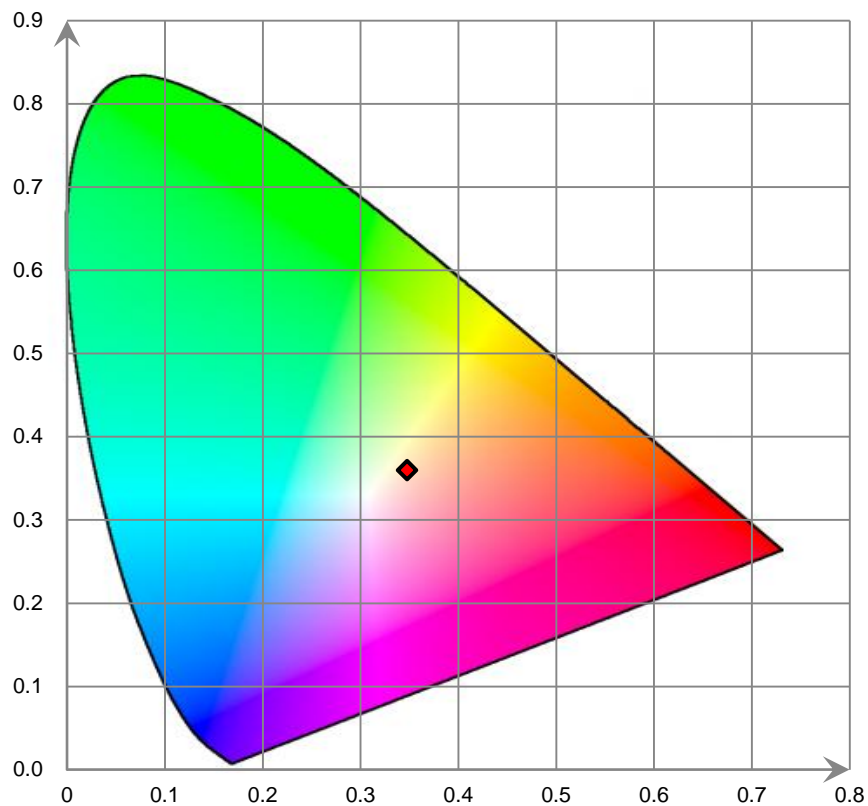
Relative Spectral Power Distribution



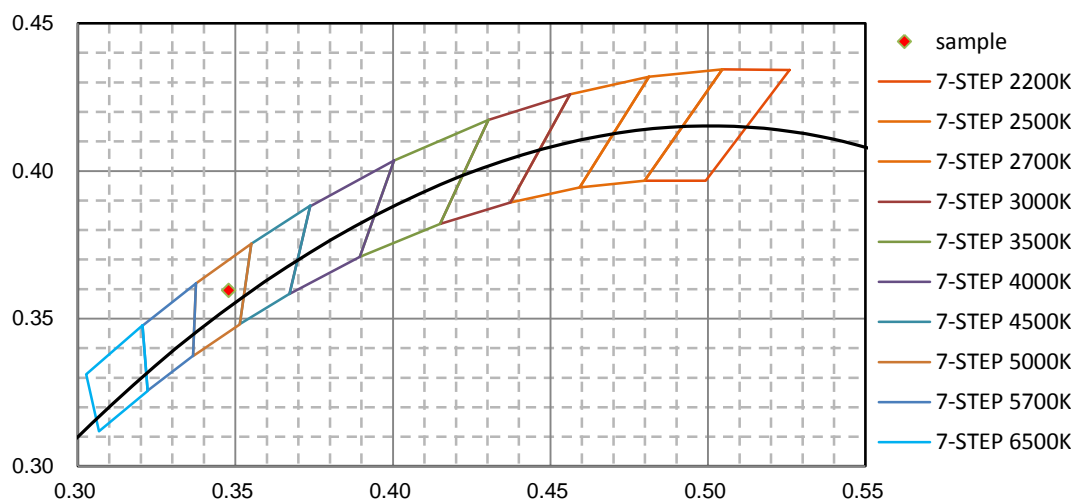
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.193E+00	421	4.004E+00	462	4.379E+01	503	3.401E+01	544	4.615E+01
381	1.077E+00	422	4.502E+00	463	4.214E+01	504	3.465E+01	545	4.638E+01
382	1.124E+00	423	5.007E+00	464	4.052E+01	505	3.525E+01	546	4.653E+01
383	8.609E-01	424	5.636E+00	465	3.918E+01	506	3.584E+01	547	4.667E+01
384	8.050E-01	425	6.288E+00	466	3.736E+01	507	3.630E+01	548	4.680E+01
385	8.895E-01	426	7.010E+00	467	3.591E+01	508	3.678E+01	549	4.693E+01
386	7.306E-01	427	7.892E+00	468	3.411E+01	509	3.726E+01	550	4.717E+01
387	7.198E-01	428	8.819E+00	469	3.246E+01	510	3.770E+01	551	4.732E+01
388	6.544E-01	429	9.875E+00	470	3.058E+01	511	3.824E+01	552	4.742E+01
389	6.797E-01	430	1.113E+01	471	2.890E+01	512	3.877E+01	553	4.762E+01
390	5.885E-01	431	1.238E+01	472	2.742E+01	513	3.911E+01	554	4.779E+01
391	5.877E-01	432	1.380E+01	473	2.599E+01	514	3.945E+01	555	4.793E+01
392	5.829E-01	433	1.545E+01	474	2.479E+01	515	3.984E+01	556	4.812E+01
393	6.242E-01	434	1.726E+01	475	2.394E+01	516	4.015E+01	557	4.826E+01
394	5.606E-01	435	1.918E+01	476	2.322E+01	517	4.052E+01	558	4.842E+01
395	5.241E-01	436	2.139E+01	477	2.277E+01	518	4.078E+01	559	4.862E+01
396	5.297E-01	437	2.371E+01	478	2.250E+01	519	4.116E+01	560	4.876E+01
397	5.390E-01	438	2.650E+01	479	2.240E+01	520	4.145E+01	561	4.892E+01
398	5.776E-01	439	2.941E+01	480	2.237E+01	521	4.165E+01	562	4.900E+01
399	5.673E-01	440	3.289E+01	481	2.245E+01	522	4.199E+01	563	4.913E+01
400	6.196E-01	441	3.667E+01	482	2.258E+01	523	4.220E+01	564	4.933E+01
401	5.978E-01	442	4.088E+01	483	2.277E+01	524	4.248E+01	565	4.939E+01
402	6.114E-01	443	4.569E+01	484	2.302E+01	525	4.277E+01	566	4.961E+01
403	6.180E-01	444	5.087E+01	485	2.331E+01	526	4.297E+01	567	4.970E+01
404	6.599E-01	445	5.667E+01	486	2.367E+01	527	4.310E+01	568	4.977E+01
405	7.131E-01	446	6.218E+01	487	2.398E+01	528	4.334E+01	569	5.002E+01
406	7.410E-01	447	6.750E+01	488	2.434E+01	529	4.345E+01	570	5.015E+01
407	8.208E-01	448	7.248E+01	489	2.482E+01	530	4.381E+01	571	5.030E+01
408	8.919E-01	449	7.624E+01	490	2.528E+01	531	4.400E+01	572	5.031E+01
409	9.682E-01	450	7.910E+01	491	2.584E+01	532	4.423E+01	573	5.046E+01
410	1.077E+00	451	7.988E+01	492	2.649E+01	533	4.436E+01	574	5.055E+01
411	1.174E+00	452	7.922E+01	493	2.717E+01	534	4.450E+01	575	5.066E+01
412	1.341E+00	453	7.686E+01	494	2.789E+01	535	4.465E+01	576	5.068E+01
413	1.460E+00	454	7.336E+01	495	2.851E+01	536	4.481E+01	577	5.082E+01
414	1.672E+00	455	6.889E+01	496	2.918E+01	537	4.505E+01	578	5.080E+01
415	1.928E+00	456	6.415E+01	497	2.992E+01	538	4.520E+01	579	5.099E+01
416	2.195E+00	457	5.936E+01	498	3.060E+01	539	4.536E+01	580	5.099E+01
417	2.538E+00	458	5.492E+01	499	3.130E+01	540	4.548E+01	581	5.103E+01
418	2.836E+00	459	5.141E+01	500	3.208E+01	541	4.568E+01	582	5.112E+01
419	3.159E+00	460	4.828E+01	501	3.276E+01	542	4.579E+01	583	5.107E+01
420	3.567E+00	461	4.575E+01	502	3.326E+01	543	4.605E+01	584	5.106E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.111E+01	626	3.863E+01	667	1.589E+01	708	4.744E+00	749	1.361E+00
586	5.110E+01	627	3.812E+01	668	1.547E+01	709	4.602E+00	750	1.330E+00
587	5.104E+01	628	3.751E+01	669	1.508E+01	710	4.494E+00	751	1.293E+00
588	5.112E+01	629	3.688E+01	670	1.467E+01	711	4.374E+00	752	1.250E+00
589	5.107E+01	630	3.632E+01	671	1.427E+01	712	4.195E+00	753	1.203E+00
590	5.096E+01	631	3.567E+01	672	1.386E+01	713	4.072E+00	754	1.180E+00
591	5.090E+01	632	3.505E+01	673	1.350E+01	714	3.958E+00	755	1.139E+00
592	5.081E+01	633	3.449E+01	674	1.314E+01	715	3.843E+00	756	1.136E+00
593	5.069E+01	634	3.391E+01	675	1.277E+01	716	3.728E+00	757	1.089E+00
594	5.060E+01	635	3.328E+01	676	1.244E+01	717	3.609E+00	758	1.063E+00
595	5.040E+01	636	3.272E+01	677	1.208E+01	718	3.489E+00	759	1.039E+00
596	5.032E+01	637	3.212E+01	678	1.175E+01	719	3.424E+00	760	1.010E+00
597	5.008E+01	638	3.146E+01	679	1.140E+01	720	3.291E+00	761	9.760E-01
598	4.995E+01	639	3.090E+01	680	1.104E+01	721	3.186E+00	762	9.417E-01
599	4.975E+01	640	3.028E+01	681	1.073E+01	722	3.086E+00	763	9.244E-01
600	4.958E+01	641	2.963E+01	682	1.044E+01	723	2.995E+00	764	8.837E-01
601	4.933E+01	642	2.910E+01	683	1.014E+01	724	2.900E+00	765	8.690E-01
602	4.911E+01	643	2.844E+01	684	9.829E+00	725	2.816E+00	766	8.511E-01
603	4.880E+01	644	2.782E+01	685	9.541E+00	726	2.720E+00	767	8.329E-01
604	4.853E+01	645	2.718E+01	686	9.300E+00	727	2.662E+00	768	8.033E-01
605	4.819E+01	646	2.670E+01	687	9.040E+00	728	2.585E+00	769	7.685E-01
606	4.799E+01	647	2.610E+01	688	8.744E+00	729	2.472E+00	770	7.638E-01
607	4.758E+01	648	2.554E+01	689	8.525E+00	730	2.407E+00	771	7.346E-01
608	4.721E+01	649	2.492E+01	690	8.237E+00	731	2.342E+00	772	7.053E-01
609	4.685E+01	650	2.442E+01	691	8.018E+00	732	2.252E+00	773	7.070E-01
610	4.653E+01	651	2.380E+01	692	7.740E+00	733	2.195E+00	774	6.857E-01
611	4.613E+01	652	2.322E+01	693	7.552E+00	734	2.145E+00	775	6.628E-01
612	4.572E+01	653	2.270E+01	694	7.327E+00	735	2.072E+00	776	6.382E-01
613	4.530E+01	654	2.219E+01	695	7.079E+00	736	2.000E+00	777	6.276E-01
614	4.483E+01	655	2.162E+01	696	6.870E+00	737	1.953E+00	778	6.198E-01
615	4.437E+01	656	2.119E+01	697	6.658E+00	738	1.882E+00	779	6.063E-01
616	4.389E+01	657	2.058E+01	698	6.456E+00	739	1.836E+00	780	6.074E-01
617	4.344E+01	658	2.004E+01	699	6.294E+00	740	1.781E+00		
618	4.295E+01	659	1.965E+01	700	6.080E+00	741	1.730E+00		
619	4.247E+01	660	1.913E+01	701	5.919E+00	742	1.698E+00		
620	4.191E+01	661	1.863E+01	702	5.737E+00	743	1.641E+00		
621	4.138E+01	662	1.813E+01	703	5.559E+00	744	1.564E+00		
622	4.093E+01	663	1.764E+01	704	5.403E+00	745	1.534E+00		
623	4.031E+01	664	1.722E+01	705	5.236E+00	746	1.501E+00		
624	3.977E+01	665	1.675E+01	706	5.060E+00	747	1.468E+00		
625	3.919E+01	666	1.634E+01	707	4.891E+00	748	1.407E+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**

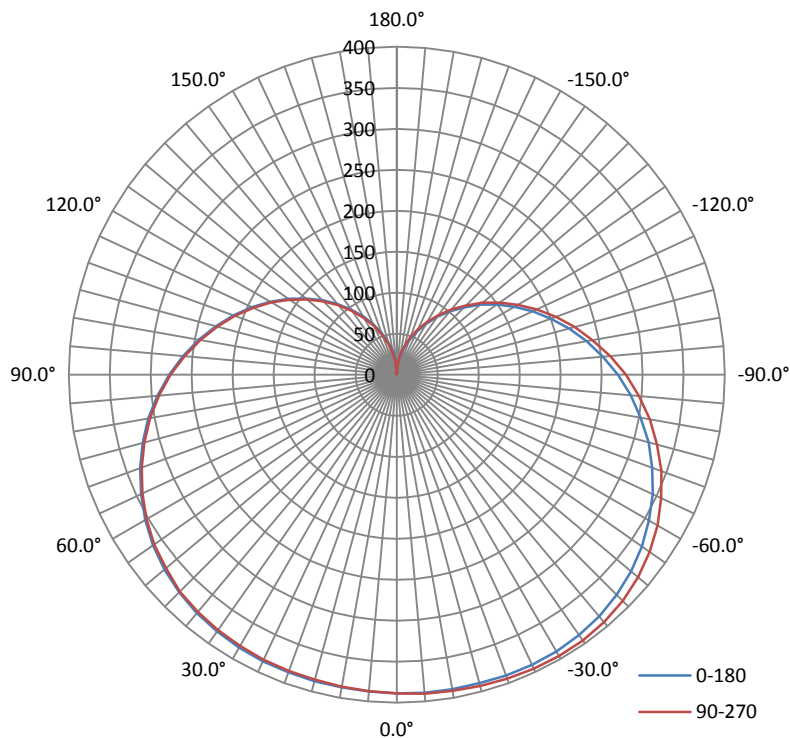
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.1958	23.37	0.9946

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
3241.73	138.72	397.0	1.53	1.56

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	226.2	225.2	225.6	227.4	226.1
Field Angle (10% I_{max}):	328.8	328.2	328.1	328.8	328.5

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	389	389	389	389	389	389	389	389
5.0°	388	387	387	387	387	388	390	389
10.0°	387	387	386	386	386	387	388	389
15.0°	387	385	385	384	385	386	388	390
20.0°	386	384	384	384	384	385	388	389
25.0°	386	383	382	382	384	385	387	389
30.0°	384	382	381	381	382	384	385	388
35.0°	382	380	378	379	380	382	384	386
40.0°	379	377	376	377	377	379	381	382
45.0°	375	372	371	372	374	375	377	379
50.0°	370	367	366	367	367	370	371	372
55.0°	363	361	359	359	361	362	364	365
60.0°	354	352	351	352	352	353	354	356
65.0°	344	342	341	342	342	344	345	345
70.0°	333	331	330	331	331	332	333	333
75.0°	321	319	318	318	319	319	320	320
80.0°	308	305	305	306	305	306	306	306
85.0°	293	291	291	291	291	290	291	290
90.0°	277	276	276	276	276	275	275	274
95.0°	261	261	260	260	260	259	259	257
100.0°	245	245	245	244	243	243	242	241
105.0°	229	228	227	228	227	226	225	223
110.0°	212	211	211	211	210	209	208	206
115.0°	195	195	194	194	193	192	191	188
120.0°	178	178	178	177	176	175	174	172
125.0°	161	162	161	161	160	158	157	154
130.0°	145	145	145	144	143	141	140	138
135.0°	129	129	128	128	126	125	124	122
140.0°	113	113	113	112	111	109	108	106
145.0°	97	98	97	97	95	94	93	91
150.0°	83	83	82	81	80	79	78	76
155.0°	68	68	68	67	66	64	63	62
160.0°	55	54	54	53	52	50	49	49
165.0°	42	42	41	40	39	38	37	37
170.0°	31	30	30	29	27	27	26	26
175.0°	20	19	19	18	16	16	15	15
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°	389	389	389	389	389	389	389	389
5.0°	389	390	389	389	390	390	390	389
10.0°	389	390	391	392	392	392	390	389
15.0°	389	392	393	393	393	393	392	389
20.0°	390	393	394	395	394	393	391	389
25.0°	390	393	394	395	396	394	392	388
30.0°	390	392	395	396	396	394	392	387
35.0°	388	391	393	396	396	393	391	387
40.0°	384	388	391	393	394	392	388	383
45.0°	379	383	387	390	390	388	384	380
50.0°	373	377	381	384	384	382	378	373
55.0°	365	369	373	375	377	374	372	366
60.0°	355	359	363	366	367	365	363	357
65.0°	344	348	351	354	356	354	352	347
70.0°	332	334	338	342	343	342	340	335
75.0°	318	320	324	326	329	328	327	322
80.0°	302	305	308	311	313	313	312	308
85.0°	286	288	292	294	297	297	296	294
90.0°	270	271	274	277	280	280	280	277
95.0°	253	254	256	259	261	262	263	261
100.0°	235	236	238	241	242	244	246	244
105.0°	218	218	220	222	225	226	228	227
110.0°	200	200	202	204	206	208	210	210
115.0°	183	183	184	186	188	190	193	193
120.0°	166	165	166	168	171	173	176	176
125.0°	149	149	150	151	153	156	158	159
130.0°	133	132	133	134	137	139	142	142
135.0°	116	115	116	117	119	122	124	125
140.0°	101	100	100	102	104	106	109	110
145.0°	86	85	86	87	89	91	93	94
150.0°	72	71	71	72	74	76	78	79
155.0°	58	58	58	59	61	62	64	65
160.0°	45	46	46	46	48	49	51	52
165.0°	34	34	34	35	36	37	39	39
170.0°	23	23	24	25	26	27	28	28
175.0°	12	11	12	12	14	15	17	18
180.0°	1	1	1	1	1	1	1	1

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	9.3	0.29	0-5	9.3	0.29
5-10	27.8	0.86	0-10	37.1	1.15
10-15	46.2	1.42	0-15	83.3	2.57
15-20	64.1	1.98	0-20	147.4	4.55
20-25	81.6	2.51	0-25	229.0	7.06
25-30	98.3	3.04	0-30	327.3	10.10
30-35	114.1	3.52	0-35	441.5	13.62
35-40	128.6	3.96	0-40	570.1	17.58
40-45	141.5	4.37	0-45	711.5	21.95
45-50	152.4	4.70	0-50	863.9	26.65
50-55	161.1	4.97	0-55	1025.0	31.62
55-60	167.4	5.16	0-60	1192.4	36.78
60-65	171.4	5.29	0-65	1363.8	42.07
65-70	172.7	5.33	0-70	1536.5	47.40
70-75	171.8	5.30	0-75	1708.3	52.70
75-80	168.4	5.19	0-80	1876.7	57.89
80-85	162.9	5.03	0-85	2039.6	62.92
85-90	155.5	4.79	0-90	2195.1	67.71
90-95	146.5	4.52	0-95	2341.7	72.23
95-100	136.2	4.21	0-100	2477.9	76.44
100-105	125.0	3.85	0-105	2602.8	80.29
105-110	113.0	3.49	0-110	2715.8	83.78
110-115	100.7	3.10	0-115	2816.5	86.88
115-120	88.3	2.73	0-120	2904.8	89.61
120-125	76.1	2.34	0-125	2980.9	91.95
125-130	64.3	1.99	0-130	3045.2	93.94
130-135	53.1	1.63	0-135	3098.3	95.57
135-140	42.6	1.32	0-140	3140.9	96.89
140-145	33.3	1.03	0-145	3174.2	97.92
145-150	25.0	0.77	0-150	3199.1	98.69
150-155	17.8	0.55	0-155	3216.9	99.24
155-160	11.9	0.36	0-160	3228.8	99.60
160-165	7.2	0.23	0-165	3236.1	99.83
165-170	3.9	0.11	0-170	3239.9	99.94
170-175	1.6	0.05	0-175	3241.5	99.99
175-180	0.2	0.01	0-180	3241.7	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*****