

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: INFT8/840/DIM010UNV

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200825090-10
Test Date:	2020-08-28 to 2020-09-05
Report Date:	2020-09-07
Reviewed By:	Ray Gao/ EE Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan). No.248 Chenghu Road, Kunshan, Jiangsu province, China. Tel: +86-0512-86175000 Fax: +86-0512-88934268
Accreditation:	The IAS Accreditation Number TL-749.

1. Product Description

General Information:

One sample was received on 2020-08-25 and used for testing.

Model Tested: INFT8/840/DIM010UNV
 Manufacturer: GREEN CREATIVE LTD
 Brand Name: GREEN CREATIVE
 Product Designation: LED Recessed Downlight
 Burning Time Before Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120-277VAC 50/60Hz
 Rated Power: 17W
 Nominal CCT: 4000K
 Nominal Lumen Output: 2125lm

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

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Integrating Sphere	INVENTFINE	Dia 1.5m	JWWCV090112	2020-01-22	2021-01-21
Power Meter	INVENTFINE	WT500	GSJWQ20009	2020-04-02	2021-04-01
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2020-01-22	2021-01-21
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2020-04-02	2021-04-01
Standard Light Source	INVENTFINE	N/A	JWWCR020104	2019-11-19	2020-11-18
Thermal Meter	KEJIAN	TA298	N/A	2019-12-02	2020-12-01
DC Power Supply	INVENTFINE	WL3005	JWWCP020069	2019-12-20	2020-12-19
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	2020-04-02	2021-04-01
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	2019-12-20	2020-12-19
Power Meter	INVENTFINE	WT500	GSDSQ200007	2020-04-02	2021-04-01
Goniophotometer	INVENTFINE	GPM-1900	YWGCF120001	2020-01-22	2021-01-21
Wireless Weather Station	ZHONGXING	KG218	N/A	2019-12-02	2020-12-01
Standard Light Source	INVENTFINE	N/A	JWBYR040008	2020-03-19	2021-03-18

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) 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 $U_{re}=2.61\%$ ($k=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=34\text{K}$ ($k=2$), at the 95% confidence level. The uncertainty of the CRI is $U=2.5(k=2)$, at the 95% confidence level.

The uncertainty of power meter AC current $U_{re}=0.48\%$ of rdg, AC Voltage $U_{re}=0.25\%$ of rdg, Power $U_{re}=0.44\%$, ($k=2$), 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 flux is $U_{re}=2.6\%$ ($k=2$), at the 95% confidence level.

Fidelity Index and Gamut Index Calculation

The R_i , R_g was calculated according to IES TM-30-18 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: **Downward**

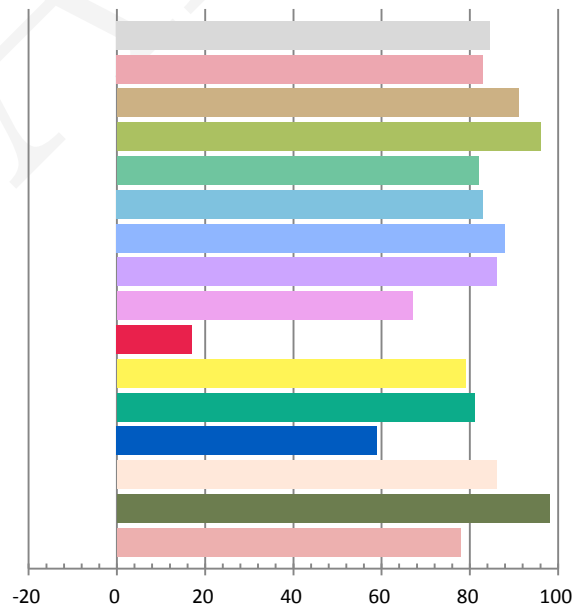
Photometric and Electrical Measurement Result

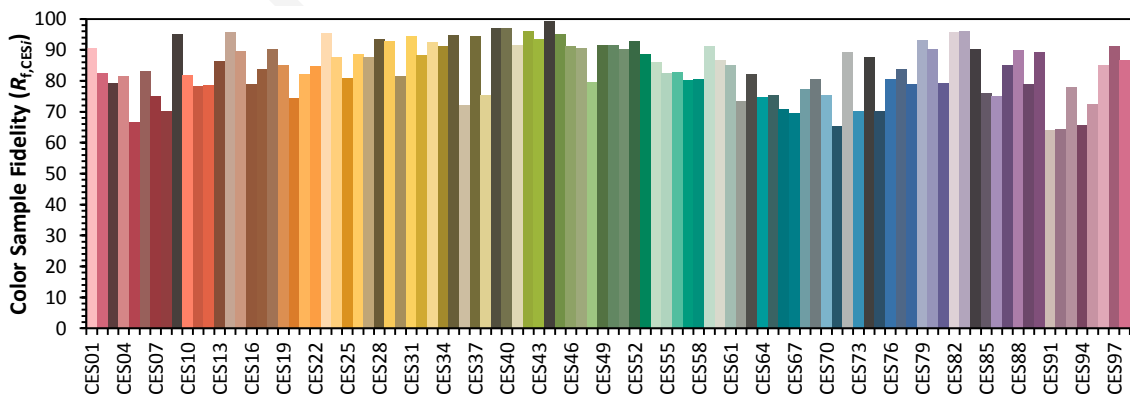
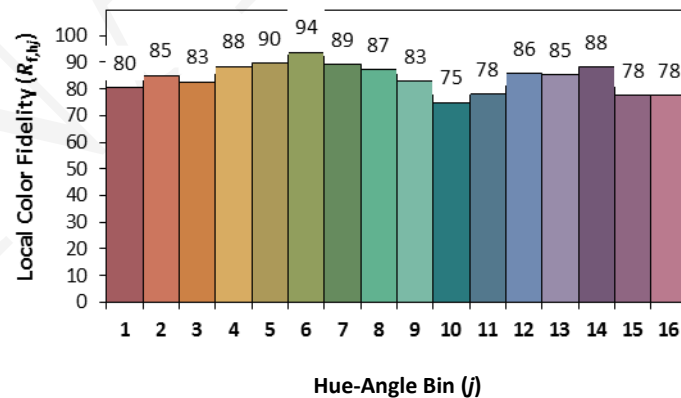
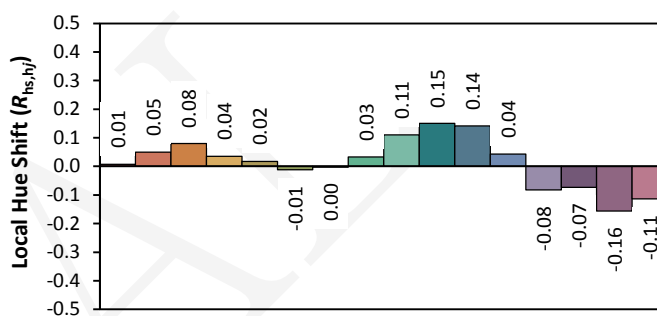
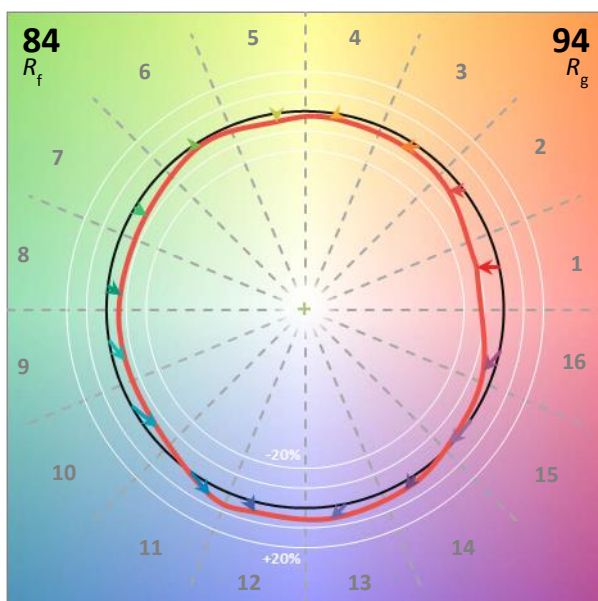
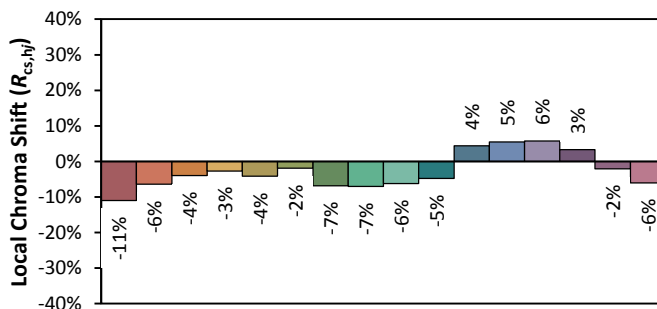
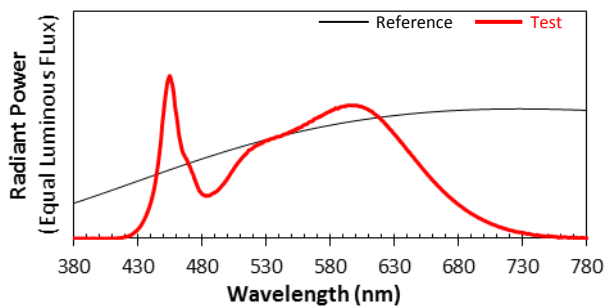
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.1449	16.96	0.9754	2199.41	129.68

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
6.667	3984	0.00157	0.3823	0.3813	0.2245	0.5038

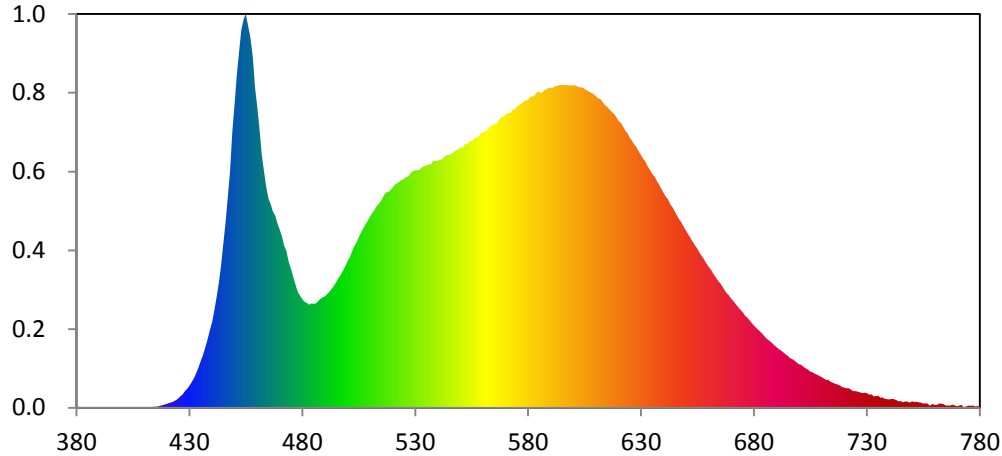
Color Rendering Index

Ra			
84.6			
R1	R2	R3	R4
83	91	96	82
R5	R6	R7	R8
83	88	86	67
R9	R10	R11	R12
17	79	81	59
R13	R14	R15	
86	98	78	





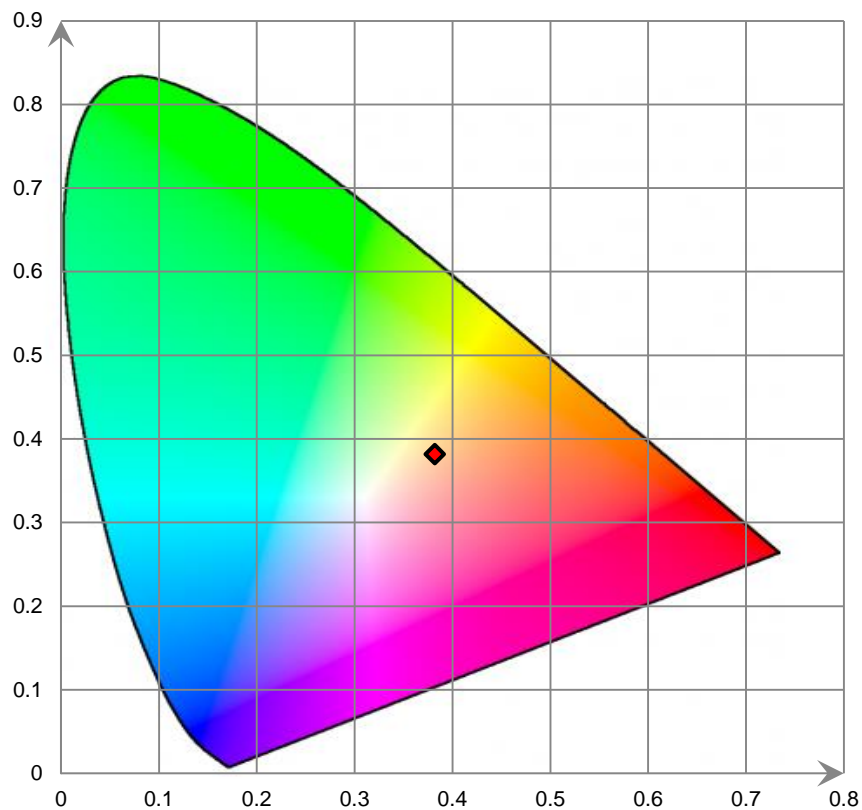
Relative Spectral Power Distribution



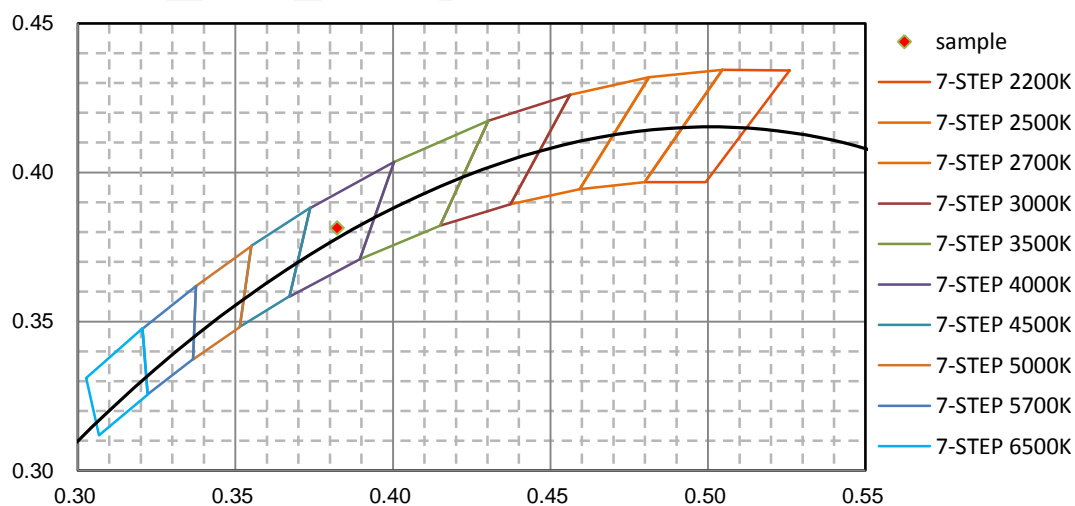
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.900E-03	421	5.450E-01	462	2.957E+01	503	1.883E+01	544	2.950E+01
381	9.720E-02	422	6.171E-01	463	2.763E+01	504	1.929E+01	545	2.954E+01
382	4.170E-02	423	7.477E-01	464	2.581E+01	505	1.990E+01	546	2.967E+01
383	2.000E-03	424	9.019E-01	465	2.447E+01	506	2.046E+01	547	2.989E+01
384	7.320E-02	425	1.086E+00	466	2.378E+01	507	2.094E+01	548	3.011E+01
385	5.120E-02	426	1.329E+00	467	2.293E+01	508	2.143E+01	549	3.018E+01
386	5.100E-03	427	1.583E+00	468	2.247E+01	509	2.184E+01	550	3.044E+01
387	6.330E-02	428	1.929E+00	469	2.154E+01	510	2.232E+01	551	3.036E+01
388	4.020E-02	429	2.200E+00	470	2.083E+01	511	2.279E+01	552	3.080E+01
389	2.310E-02	430	2.589E+00	471	2.003E+01	512	2.313E+01	553	3.081E+01
390	6.070E-02	431	3.007E+00	472	1.892E+01	513	2.358E+01	554	3.115E+01
391	2.730E-02	432	3.454E+00	473	1.831E+01	514	2.391E+01	555	3.115E+01
392	6.100E-03	433	4.045E+00	474	1.709E+01	515	2.422E+01	556	3.143E+01
393	2.500E-02	434	4.686E+00	475	1.617E+01	516	2.478E+01	557	3.154E+01
394	1.780E-02	435	5.405E+00	476	1.522E+01	517	2.515E+01	558	3.167E+01
395	5.450E-02	436	6.129E+00	477	1.431E+01	518	2.520E+01	559	3.210E+01
396	1.450E-02	437	6.994E+00	478	1.350E+01	519	2.544E+01	560	3.218E+01
397	3.650E-02	438	7.889E+00	479	1.309E+01	520	2.573E+01	561	3.234E+01
398	7.000E-03	439	8.949E+00	480	1.267E+01	521	2.608E+01	562	3.244E+01
399	3.000E-04	440	1.002E+01	481	1.236E+01	522	2.624E+01	563	3.285E+01
400	0.000E+00	441	1.142E+01	482	1.228E+01	523	2.642E+01	564	3.300E+01
401	2.630E-02	442	1.292E+01	483	1.202E+01	524	2.664E+01	565	3.322E+01
402	3.860E-02	443	1.461E+01	484	1.218E+01	525	2.674E+01	566	3.317E+01
403	2.730E-02	444	1.668E+01	485	1.213E+01	526	2.696E+01	567	3.363E+01
404	1.070E-02	445	1.921E+01	486	1.220E+01	527	2.703E+01	568	3.395E+01
405	5.720E-02	446	2.168E+01	487	1.245E+01	528	2.739E+01	569	3.401E+01
406	1.100E-02	447	2.463E+01	488	1.270E+01	529	2.767E+01	570	3.427E+01
407	7.660E-02	448	2.773E+01	489	1.290E+01	530	2.775E+01	571	3.444E+01
408	6.900E-03	449	3.225E+01	490	1.301E+01	531	2.774E+01	572	3.443E+01
409	5.900E-02	450	3.546E+01	491	1.327E+01	532	2.783E+01	573	3.479E+01
410	7.260E-02	451	3.889E+01	492	1.353E+01	533	2.812E+01	574	3.490E+01
411	8.620E-02	452	4.155E+01	493	1.389E+01	534	2.825E+01	575	3.513E+01
412	7.780E-02	453	4.413E+01	494	1.427E+01	535	2.832E+01	576	3.537E+01
413	3.370E-02	454	4.537E+01	495	1.470E+01	536	2.844E+01	577	3.554E+01
414	1.078E-01	455	4.602E+01	496	1.517E+01	537	2.847E+01	578	3.574E+01
415	1.199E-01	456	4.470E+01	497	1.550E+01	538	2.887E+01	579	3.593E+01
416	1.494E-01	457	4.337E+01	498	1.603E+01	539	2.882E+01	580	3.597E+01
417	2.089E-01	458	4.104E+01	499	1.652E+01	540	2.887E+01	581	3.635E+01
418	2.796E-01	459	3.742E+01	500	1.712E+01	541	2.896E+01	582	3.638E+01
419	3.714E-01	460	3.514E+01	501	1.757E+01	542	2.907E+01	583	3.655E+01
420	4.464E-01	461	3.258E+01	502	1.824E+01	543	2.934E+01	584	3.692E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	3.686E+01	626	3.120E+01	667	1.378E+01	708	3.853E+00	749	5.990E-01
586	3.674E+01	627	3.077E+01	668	1.340E+01	709	3.710E+00	750	7.332E-01
587	3.709E+01	628	3.045E+01	669	1.312E+01	710	3.592E+00	751	6.775E-01
588	3.720E+01	629	2.995E+01	670	1.274E+01	711	3.405E+00	752	7.007E-01
589	3.736E+01	630	2.954E+01	671	1.240E+01	712	3.242E+00	753	6.343E-01
590	3.739E+01	631	2.911E+01	672	1.208E+01	713	3.236E+00	754	5.904E-01
591	3.740E+01	632	2.877E+01	673	1.175E+01	714	3.022E+00	755	4.832E-01
592	3.759E+01	633	2.819E+01	674	1.143E+01	715	2.905E+00	756	5.295E-01
593	3.761E+01	634	2.781E+01	675	1.116E+01	716	2.799E+00	757	4.942E-01
594	3.775E+01	635	2.732E+01	676	1.078E+01	717	2.719E+00	758	2.351E-01
595	3.773E+01	636	2.698E+01	677	1.054E+01	718	2.634E+00	759	4.401E-01
596	3.773E+01	637	2.646E+01	678	1.023E+01	719	2.431E+00	760	3.159E-01
597	3.768E+01	638	2.605E+01	679	9.918E+00	720	2.362E+00	761	3.210E-01
598	3.770E+01	639	2.554E+01	680	9.596E+00	721	2.292E+00	762	4.755E-01
599	3.766E+01	640	2.511E+01	681	9.352E+00	722	2.284E+00	763	4.662E-01
600	3.769E+01	641	2.463E+01	682	9.099E+00	723	2.127E+00	764	3.935E-01
601	3.767E+01	642	2.435E+01	683	8.856E+00	724	1.941E+00	765	2.740E-01
602	3.752E+01	643	2.375E+01	684	8.561E+00	725	1.958E+00	766	2.537E-01
603	3.743E+01	644	2.340E+01	685	8.246E+00	726	1.877E+00	767	2.729E-01
604	3.743E+01	645	2.294E+01	686	8.002E+00	727	1.795E+00	768	3.870E-01
605	3.724E+01	646	2.243E+01	687	7.800E+00	728	1.730E+00	769	2.700E-01
606	3.708E+01	647	2.199E+01	688	7.582E+00	729	1.763E+00	770	1.807E-01
607	3.695E+01	648	2.160E+01	689	7.289E+00	730	1.702E+00	771	2.484E-01
608	3.681E+01	649	2.113E+01	690	7.068E+00	731	1.526E+00	772	3.363E-01
609	3.664E+01	650	2.067E+01	691	6.851E+00	732	1.556E+00	773	8.570E-02
610	3.642E+01	651	2.022E+01	692	6.676E+00	733	1.350E+00	774	1.481E-01
611	3.618E+01	652	1.983E+01	693	6.448E+00	734	1.337E+00	775	2.541E-01
612	3.607E+01	653	1.937E+01	694	6.231E+00	735	1.411E+00	776	2.314E-01
613	3.577E+01	654	1.894E+01	695	6.040E+00	736	1.211E+00	777	2.549E-01
614	3.539E+01	655	1.854E+01	696	5.805E+00	737	1.179E+00	778	1.575E-01
615	3.518E+01	656	1.807E+01	697	5.697E+00	738	1.038E+00	779	1.760E-01
616	3.488E+01	657	1.767E+01	698	5.501E+00	739	9.945E-01	780	1.681E-01
617	3.463E+01	658	1.728E+01	699	5.266E+00	740	9.743E-01		
618	3.432E+01	659	1.684E+01	700	5.078E+00	741	1.043E+00		
619	3.395E+01	660	1.646E+01	701	4.998E+00	742	1.008E+00		
620	3.352E+01	661	1.610E+01	702	4.769E+00	743	8.829E-01		
621	3.331E+01	662	1.567E+01	703	4.597E+00	744	7.398E-01		
622	3.286E+01	663	1.529E+01	704	4.465E+00	745	7.948E-01		
623	3.240E+01	664	1.488E+01	705	4.235E+00	746	6.283E-01		
624	3.207E+01	665	1.458E+01	706	4.140E+00	747	7.533E-01		
625	3.157E+01	666	1.419E+01	707	3.971E+00	748	6.959E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

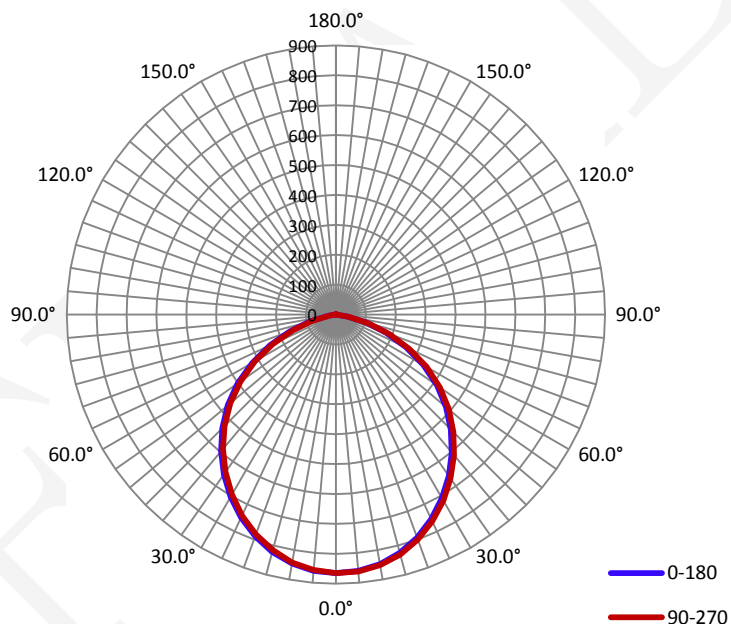
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1450	17.07	0.9800

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
2214.2	129.76	864.7	1.22	1.22

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	106.3	106.4	106.4	106.5	106.4
Field Angle(10% I_{max}):	151.5	151.5	151.5	151.6	151.5

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	865	865	865	865	865	865	865	865
5.0°	861	862	863	863	863	862	862	861
10.0°	848	848	850	850	851	851	849	847
15.0°	825	827	829	830	830	829	827	825
20.0°	793	796	799	801	801	800	797	795
25.0°	755	758	761	763	762	762	760	756
30.0°	709	713	717	719	718	718	715	711
35.0°	658	662	666	668	668	668	663	659
40.0°	603	607	611	614	614	612	609	603
45.0°	544	549	552	555	555	554	551	544
50.0°	481	486	490	493	493	490	488	482
55.0°	413	418	422	425	424	422	419	412
60.0°	337	342	346	350	349	346	341	335
65.0°	258	264	269	270	271	267	262	255
70.0°	179	184	190	191	190	188	183	177
75.0°	105	110	113	115	114	111	108	102
80.0°	38	42	44	45	43	41	39	36
85.0°	7	7	8	8	8	7	7	6
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	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	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	0	0
160.0°	0	0	1	0	1	0	0	0
165.0°	1	0	1	0	1	1	0	1
170.0°	1	1	1	1	1	1	1	1
175.0°	1	1	1	1	1	1	1	1
180.0°	0	0	0	0	0	0	0	0

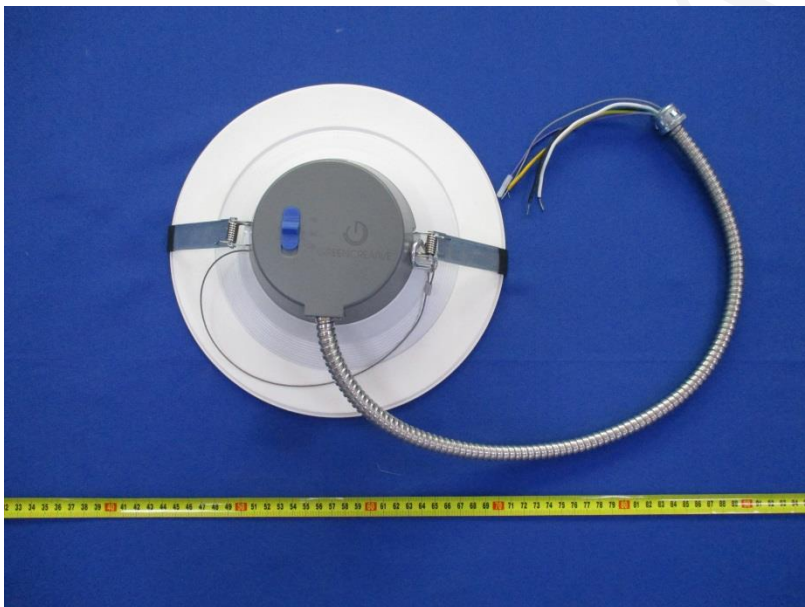
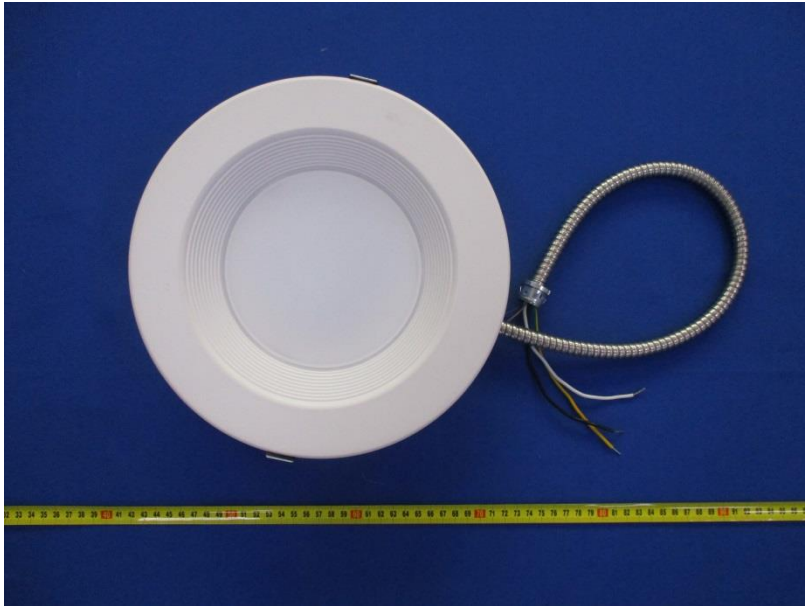
Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	865	865	865	865	865	865	865	865
5.0°	860	859	859	858	857	858	858	859
10.0°	846	844	842	842	841	842	843	844
15.0°	821	819	818	816	815	817	819	821
20.0°	789	787	785	783	782	783	785	789
25.0°	750	747	744	741	742	743	746	748
30.0°	704	700	698	695	695	696	700	702
35.0°	653	648	644	643	643	644	647	650
40.0°	597	593	588	587	587	588	591	596
45.0°	537	532	528	527	526	528	532	536
50.0°	472	467	464	463	461	464	467	471
55.0°	400	395	392	389	390	392	396	400
60.0°	323	318	313	312	312	315	318	324
65.0°	243	239	233	232	232	235	238	245
70.0°	162	158	155	153	153	156	161	166
75.0°	88	84	81	80	80	83	87	91
80.0°	26	23	21	20	21	23	25	29
85.0°	3	3	3	3	3	4	4	5
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	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	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	0	0
160.0°	0	0	0	1	0	1	0	0
165.0°	0	1	1	1	0	1	1	1
170.0°	0	1	1	1	1	1	1	2
175.0°	0	2	1	1	1	2	1	1
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	20.6	0.93	0-5	20.6	0.93
5-10	61.0	2.76	0-10	81.7	3.69
10-15	99.0	4.47	0-15	180.7	8.16
15-20	133.1	6.01	0-20	313.7	14.17
20-25	161.9	7.31	0-25	475.7	21.48
25-30	184.6	8.34	0-30	660.3	29.82
30-35	200.6	9.06	0-35	860.9	38.88
35-40	209.4	9.46	0-40	1070.3	48.34
40-45	211.2	9.54	0-45	1281.5	57.87
45-50	205.6	9.29	0-50	1487.1	67.16
50-55	192.1	8.68	0-55	1679.2	75.84
55-60	170.3	7.69	0-60	1849.5	83.53
60-65	141.2	6.38	0-65	1990.7	89.90
65-70	107.0	4.83	0-70	2097.6	94.73
70-75	70.2	3.17	0-75	2167.8	97.90
75-80	34.5	1.56	0-80	2202.3	99.46
80-85	10.2	0.46	0-85	2212.5	99.92
85-90	1.4	0.07	0-90	2214.0	99.99
90-95	0.0	0.00	0-95	2214.0	99.99
95-100	0.0	0.00	0-100	2214.0	99.99
100-105	0.0	0.00	0-105	2214.0	99.99
105-110	0.0	0.00	0-110	2214.0	99.99
110-115	0.0	0.00	0-115	2214.0	99.99
115-120	0.0	0.00	0-120	2214.0	99.99
120-125	0.0	0.00	0-125	2214.0	99.99
125-130	0.0	0.00	0-130	2214.0	99.99
130-135	0.0	0.00	0-135	2214.0	99.99
135-140	0.0	0.00	0-140	2214.0	99.99
140-145	0.0	0.00	0-145	2214.0	99.99
145-150	0.0	0.00	0-150	2214.0	99.99
150-155	0.0	0.00	0-155	2214.0	99.99
155-160	0.0	0.00	0-160	2214.0	99.99
160-165	0.1	0.00	0-165	2214.0	99.99
165-170	0.1	0.00	0-170	2214.1	100.00
170-175	0.1	0.00	0-175	2214.2	100.00
175-180	0.0	0.00	0-180	2214.2	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*****