

# 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: INFT6/840/DIM010UNV**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
<b>Test Engineer:</b>	George Yang
<b>Report Number:</b>	PKS200825086-10
<b>Test Date:</b>	2020-08-28 to 2020-09-05
<b>Report Date:</b>	2020-09-07
<b>Reviewed By:</b>	Ray Gao/ EE Engineer
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Kunshan). No.248 Chenghu Road, Kunshan, Jiangsu province, China. Tel: +86-0512-86175000 Fax: +86-0512-88934268
<b>Accreditation:</b>	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: INFT6/840/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: 13W  
 Nominal CCT: 4000K  
 Nominal Lumen Output: 1600lm

## 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.

$4\pi$  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  $U_{rel}=2.61\%$  ( $k=2$ ), 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  $U_{rel}=0.48\%$  of rdg, AC Voltage  $U_{rel}=0.25\%$  of rdg, Power  $U_{rel}=0.44\%$ , ( $k=2$ ), 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 ( $\gamma$ ) 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 flux is  $U_{rel}=2.6\%$  ( $k=2$ ), 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**

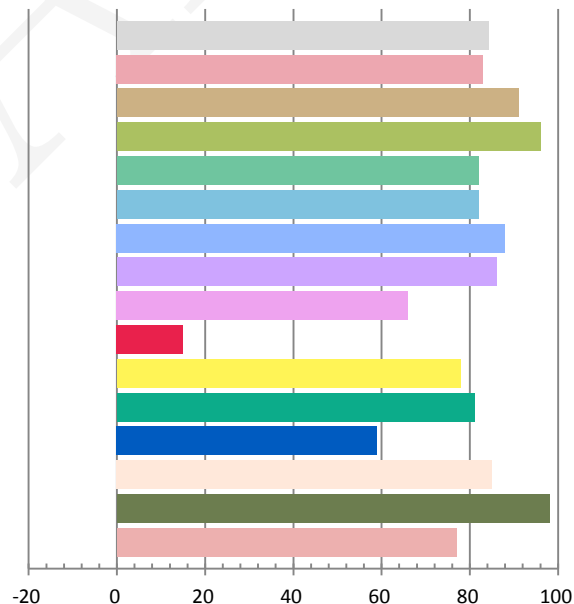
### Photometric and Electrical Measurement Result

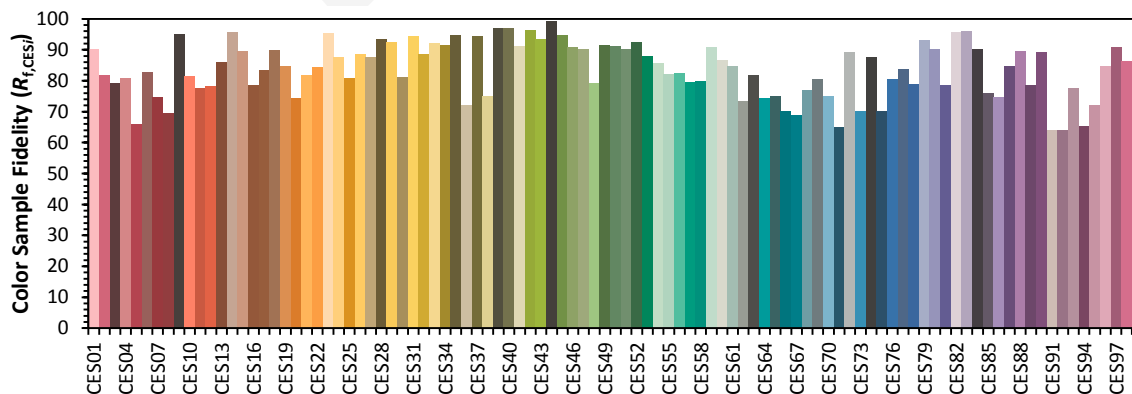
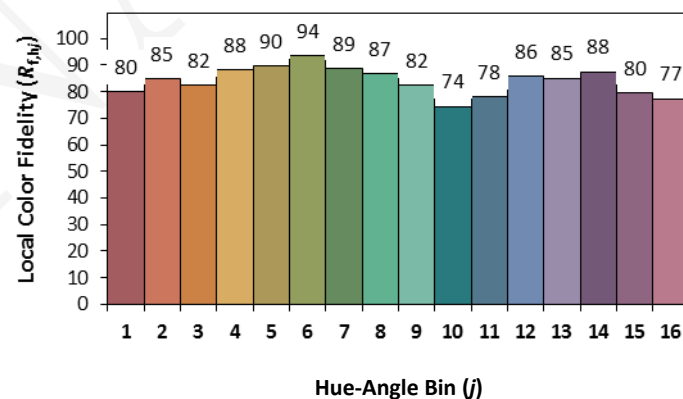
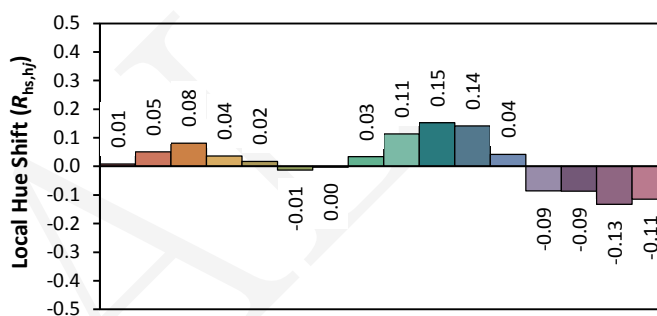
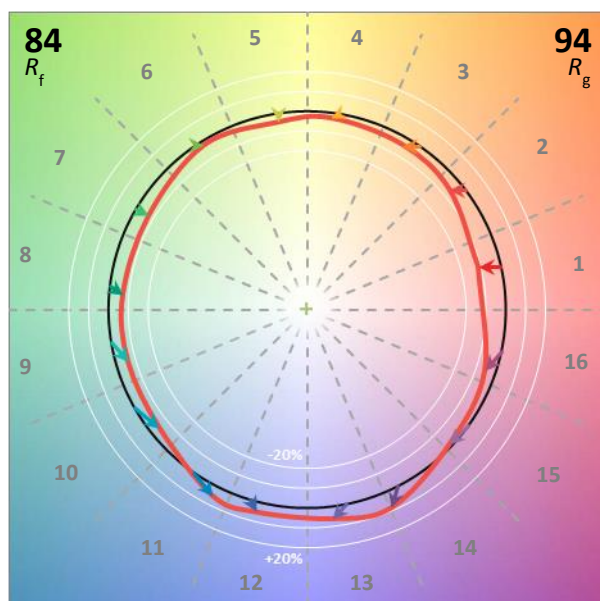
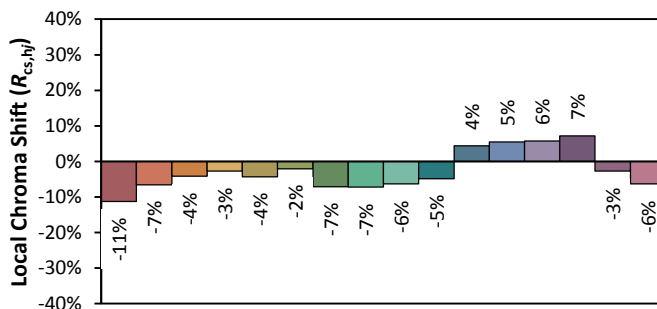
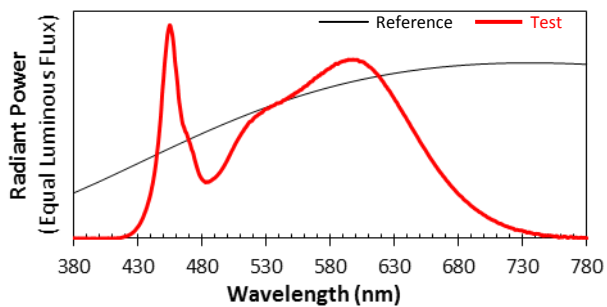
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
119.98	60	0.1037	12.27	0.9858	1667.14	135.87

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
5.030	3941	0.00170	0.3843	0.3828	0.2252	0.5048

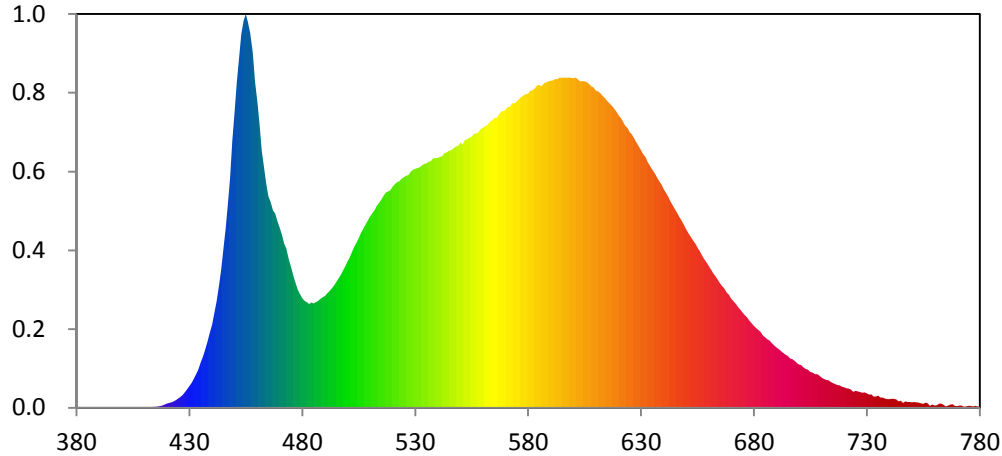
### Color Rendering Index

<b>Ra</b>			
84.2			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
83	91	96	82
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
82	88	86	66
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
15	78	81	59
<b>R13</b>	<b>R14</b>	<b>R15</b>	
85	98	77	





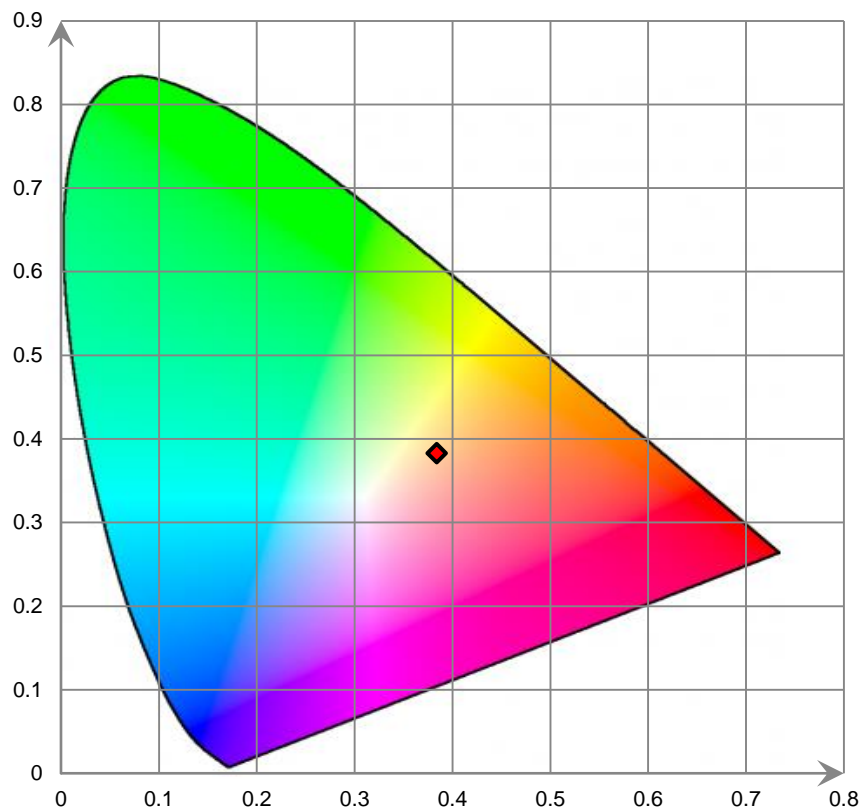
### Relative Spectral Power Distribution



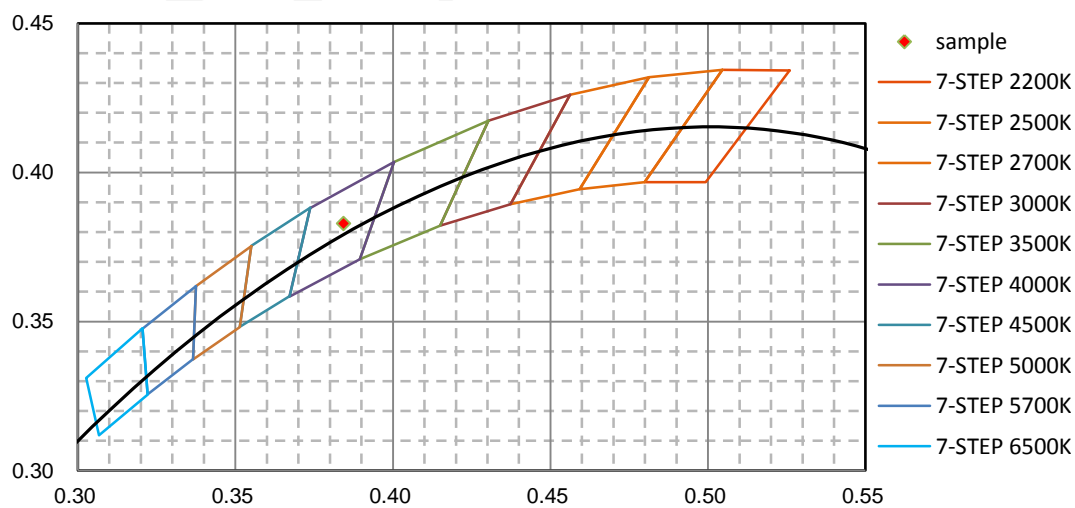
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.870E-02	421	4.014E-01	462	2.243E+01	503	1.403E+01	544	2.227E+01
381	5.680E-02	422	4.711E-01	463	2.100E+01	504	1.439E+01	545	2.241E+01
382	2.700E-02	423	5.664E-01	464	1.953E+01	505	1.480E+01	546	2.248E+01
383	3.720E-02	424	6.607E-01	465	1.842E+01	506	1.524E+01	547	2.263E+01
384	6.180E-02	425	8.068E-01	466	1.793E+01	507	1.560E+01	548	2.280E+01
385	4.780E-02	426	9.538E-01	467	1.723E+01	508	1.596E+01	549	2.286E+01
386	5.400E-03	427	1.129E+00	468	1.695E+01	509	1.631E+01	550	2.310E+01
387	5.700E-02	428	1.362E+00	469	1.628E+01	510	1.666E+01	551	2.298E+01
388	2.120E-02	429	1.613E+00	470	1.571E+01	511	1.699E+01	552	2.336E+01
389	2.040E-02	430	1.883E+00	471	1.510E+01	512	1.725E+01	553	2.341E+01
390	5.780E-02	431	2.167E+00	472	1.431E+01	513	1.764E+01	554	2.356E+01
391	3.090E-02	432	2.527E+00	473	1.388E+01	514	1.789E+01	555	2.365E+01
392	4.100E-03	433	2.926E+00	474	1.301E+01	515	1.816E+01	556	2.388E+01
393	7.100E-03	434	3.356E+00	475	1.223E+01	516	1.851E+01	557	2.391E+01
394	2.050E-02	435	3.926E+00	476	1.151E+01	517	1.877E+01	558	2.405E+01
395	4.650E-02	436	4.440E+00	477	1.087E+01	518	1.887E+01	559	2.432E+01
396	1.510E-02	437	5.041E+00	478	1.026E+01	519	1.898E+01	560	2.444E+01
397	1.930E-02	438	5.726E+00	479	9.889E+00	520	1.928E+01	561	2.458E+01
398	6.800E-03	439	6.464E+00	480	9.554E+00	521	1.950E+01	562	2.464E+01
399	3.000E-04	440	7.254E+00	481	9.335E+00	522	1.967E+01	563	2.493E+01
400	0.000E+00	441	8.276E+00	482	9.204E+00	523	1.977E+01	564	2.507E+01
401	2.070E-02	442	9.307E+00	483	9.032E+00	524	1.999E+01	565	2.528E+01
402	2.500E-02	443	1.057E+01	484	9.169E+00	525	2.010E+01	566	2.529E+01
403	2.380E-02	444	1.200E+01	485	9.089E+00	526	2.023E+01	567	2.557E+01
404	3.960E-02	445	1.381E+01	486	9.219E+00	527	2.031E+01	568	2.583E+01
405	4.340E-02	446	1.558E+01	487	9.314E+00	528	2.057E+01	569	2.588E+01
406	1.450E-02	447	1.773E+01	488	9.481E+00	529	2.078E+01	570	2.602E+01
407	6.360E-02	448	2.003E+01	489	9.638E+00	530	2.087E+01	571	2.625E+01
408	1.790E-02	449	2.332E+01	490	9.749E+00	531	2.092E+01	572	2.626E+01
409	5.250E-02	450	2.575E+01	491	9.977E+00	532	2.098E+01	573	2.659E+01
410	6.400E-02	451	2.840E+01	492	1.015E+01	533	2.116E+01	574	2.656E+01
411	5.460E-02	452	3.049E+01	493	1.042E+01	534	2.128E+01	575	2.672E+01
412	6.620E-02	453	3.258E+01	494	1.065E+01	535	2.133E+01	576	2.695E+01
413	3.330E-02	454	3.372E+01	495	1.096E+01	536	2.146E+01	577	2.712E+01
414	8.000E-02	455	3.436E+01	496	1.126E+01	537	2.153E+01	578	2.725E+01
415	9.380E-02	456	3.362E+01	497	1.157E+01	538	2.177E+01	579	2.737E+01
416	1.016E-01	457	3.267E+01	498	1.196E+01	539	2.177E+01	580	2.739E+01
417	1.451E-01	458	3.098E+01	499	1.233E+01	540	2.180E+01	581	2.766E+01
418	2.063E-01	459	2.846E+01	500	1.274E+01	541	2.188E+01	582	2.772E+01
419	2.632E-01	460	2.676E+01	501	1.313E+01	542	2.193E+01	583	2.789E+01
420	3.560E-01	461	2.479E+01	502	1.360E+01	543	2.221E+01	584	2.814E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	2.814E+01	626	2.383E+01	667	1.037E+01	708	2.917E+00	749	4.928E-01
586	2.807E+01	627	2.348E+01	668	1.006E+01	709	2.788E+00	750	4.645E-01
587	2.829E+01	628	2.313E+01	669	9.854E+00	710	2.624E+00	751	5.063E-01
588	2.839E+01	629	2.282E+01	670	9.529E+00	711	2.497E+00	752	4.783E-01
589	2.847E+01	630	2.246E+01	671	9.274E+00	712	2.417E+00	753	4.356E-01
590	2.853E+01	631	2.212E+01	672	9.052E+00	713	2.412E+00	754	3.786E-01
591	2.854E+01	632	2.189E+01	673	8.771E+00	714	2.268E+00	755	3.195E-01
592	2.867E+01	633	2.144E+01	674	8.531E+00	715	2.154E+00	756	4.417E-01
593	2.867E+01	634	2.111E+01	675	8.289E+00	716	2.063E+00	757	3.962E-01
594	2.880E+01	635	2.079E+01	676	8.070E+00	717	1.992E+00	758	1.520E-01
595	2.878E+01	636	2.047E+01	677	7.865E+00	718	1.966E+00	759	2.663E-01
596	2.880E+01	637	2.010E+01	678	7.589E+00	719	1.829E+00	760	2.044E-01
597	2.877E+01	638	1.977E+01	679	7.372E+00	720	1.790E+00	761	2.127E-01
598	2.880E+01	639	1.947E+01	680	7.141E+00	721	1.696E+00	762	3.641E-01
599	2.877E+01	640	1.906E+01	681	6.957E+00	722	1.667E+00	763	3.519E-01
600	2.874E+01	641	1.875E+01	682	6.784E+00	723	1.593E+00	764	2.608E-01
601	2.880E+01	642	1.842E+01	683	6.612E+00	724	1.384E+00	765	1.110E-01
602	2.865E+01	643	1.800E+01	684	6.314E+00	725	1.463E+00	766	1.788E-01
603	2.847E+01	644	1.768E+01	685	6.151E+00	726	1.414E+00	767	2.674E-01
604	2.851E+01	645	1.734E+01	686	5.980E+00	727	1.358E+00	768	3.075E-01
605	2.847E+01	646	1.701E+01	687	5.849E+00	728	1.305E+00	769	1.752E-01
606	2.839E+01	647	1.665E+01	688	5.645E+00	729	1.335E+00	770	1.314E-01
607	2.824E+01	648	1.634E+01	689	5.426E+00	730	1.265E+00	771	1.777E-01
608	2.804E+01	649	1.597E+01	690	5.253E+00	731	1.138E+00	772	1.982E-01
609	2.793E+01	650	1.558E+01	691	5.100E+00	732	1.181E+00	773	6.880E-02
610	2.767E+01	651	1.525E+01	692	4.950E+00	733	9.663E-01	774	1.202E-01
611	2.760E+01	652	1.493E+01	693	4.772E+00	734	9.785E-01	775	1.609E-01
612	2.745E+01	653	1.462E+01	694	4.642E+00	735	1.049E+00	776	1.619E-01
613	2.721E+01	654	1.432E+01	695	4.513E+00	736	9.043E-01	777	9.920E-02
614	2.704E+01	655	1.396E+01	696	4.297E+00	737	9.053E-01	778	1.614E-01
615	2.677E+01	656	1.364E+01	697	4.235E+00	738	8.051E-01	779	1.170E-01
616	2.657E+01	657	1.329E+01	698	4.087E+00	739	7.506E-01	780	8.470E-02
617	2.638E+01	658	1.296E+01	699	3.913E+00	740	7.546E-01		
618	2.609E+01	659	1.267E+01	700	3.779E+00	741	7.881E-01		
619	2.586E+01	660	1.237E+01	701	3.709E+00	742	7.781E-01		
620	2.551E+01	661	1.207E+01	702	3.509E+00	743	7.223E-01		
621	2.530E+01	662	1.173E+01	703	3.368E+00	744	5.545E-01		
622	2.497E+01	663	1.148E+01	704	3.318E+00	745	6.036E-01		
623	2.461E+01	664	1.116E+01	705	3.129E+00	746	4.106E-01		
624	2.441E+01	665	1.087E+01	706	3.059E+00	747	5.412E-01		
625	2.403E+01	666	1.061E+01	707	2.928E+00	748	5.021E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles





### [Goniophotometer System]

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

Test orientation: **Downward**

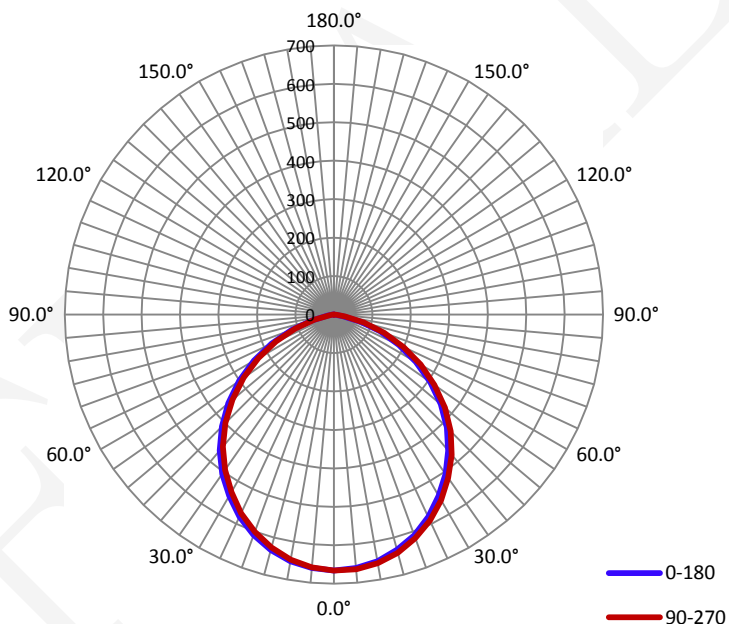
### Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1040	12.34	0.9900

### Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1677.3	135.97	665.4	1.22	1.22

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% $I_{max}$ ):	104.8	104.9	104.8	104.9	104.9
Field Angle(10% $I_{max}$ ):	149.9	150.1	150.1	150.1	150.1

**Luminous Intensity (cd) Distribution Data**

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	665	665	665	665	665	665	665	665
5.0°	662	662	663	665	665	664	665	664
10.0°	652	653	655	656	656	656	656	655
15.0°	633	636	639	640	642	640	640	638
20.0°	611	612	616	618	619	619	618	615
25.0°	580	585	587	590	591	591	589	586
30.0°	545	550	552	556	557	557	555	552
35.0°	506	510	515	518	518	519	517	514
40.0°	462	468	472	476	477	476	474	470
45.0°	415	420	425	429	429	429	427	423
50.0°	363	368	373	377	377	375	375	370
55.0°	306	311	316	318	320	319	316	312
60.0°	247	251	255	259	260	259	256	253
65.0°	186	192	195	198	200	199	196	192
70.0°	127	132	136	139	139	138	137	132
75.0°	71	75	78	81	81	80	77	73
80.0°	23	26	28	30	30	28	26	23
85.0°	6	7	8	8	8	8	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	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	1	0	0	0	0	1
180.0°	0	0	0	0	0	0	0	0

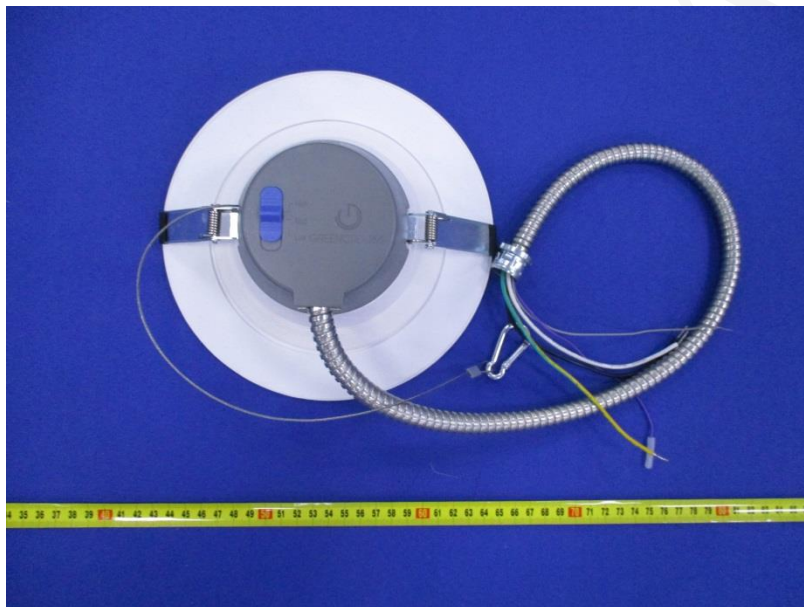
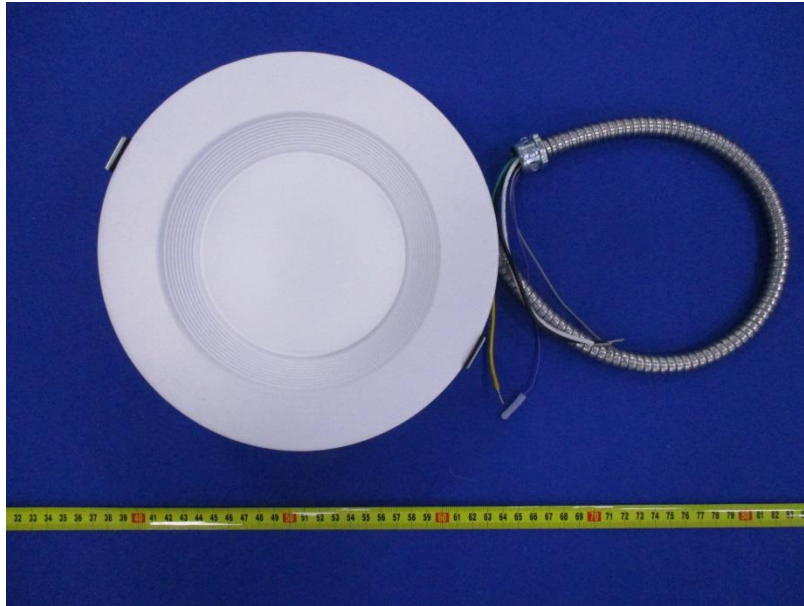
Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	665	665	665	665	665	665	665	665
5.0°	661	661	661	661	660	659	660	661
10.0°	651	650	649	648	648	647	647	649
15.0°	634	631	630	629	628	627	629	630
20.0°	610	607	604	603	601	601	603	604
25.0°	581	576	573	571	570	570	572	574
30.0°	545	542	538	536	533	533	535	538
35.0°	506	501	497	495	494	494	495	498
40.0°	462	458	453	450	449	449	451	454
45.0°	412	408	404	401	398	399	402	406
50.0°	358	353	349	346	344	344	348	352
55.0°	301	295	291	287	286	286	290	295
60.0°	240	235	230	227	227	227	230	235
65.0°	179	175	170	168	166	168	170	175
70.0°	117	114	111	109	107	108	111	115
75.0°	60	57	55	53	53	54	56	59
80.0°	16	15	14	14	14	15	15	17
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	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	1	1
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

### Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	15.9	0.95	0-5	15.9	0.95
5-10	47.0	2.80	0-10	62.9	3.75
10-15	76.3	4.55	0-15	139.1	8.30
15-20	102.5	6.11	0-20	241.7	14.41
20-25	124.8	7.44	0-25	366.5	21.85
25-30	142.4	8.49	0-30	508.9	30.34
30-35	154.8	9.23	0-35	663.7	39.57
35-40	161.6	9.63	0-40	825.3	49.20
40-45	162.3	9.68	0-45	987.6	58.88
45-50	156.6	9.33	0-50	1144.2	68.22
50-55	144.3	8.60	0-55	1288.5	76.82
55-60	126.2	7.53	0-60	1414.7	84.34
60-65	103.6	6.18	0-65	1518.3	90.52
65-70	77.5	4.62	0-70	1595.8	95.14
70-75	49.6	2.95	0-75	1645.4	98.10
75-80	23.3	1.39	0-80	1668.7	99.49
80-85	7.1	0.42	0-85	1675.8	99.91
85-90	1.5	0.09	0-90	1677.3	100.00
90-95	0.0	0.00	0-95	1677.3	100.00
95-100	0.0	0.00	0-100	1677.3	100.00
100-105	0.0	0.00	0-105	1677.3	100.00
105-110	0.0	0.00	0-110	1677.3	100.00
110-115	0.0	0.00	0-115	1677.3	100.00
115-120	0.0	0.00	0-120	1677.3	100.00
120-125	0.0	0.00	0-125	1677.3	100.00
125-130	0.0	0.00	0-130	1677.3	100.00
130-135	0.0	0.00	0-135	1677.3	100.00
135-140	0.0	0.00	0-140	1677.3	100.00
140-145	0.0	0.00	0-145	1677.3	100.00
145-150	0.0	0.00	0-150	1677.3	100.00
150-155	0.0	0.00	0-155	1677.3	100.00
155-160	0.0	0.00	0-160	1677.3	100.00
160-165	0.0	0.00	0-165	1677.3	100.00
165-170	0.0	0.00	0-170	1677.3	100.00
170-175	0.0	0.00	0-175	1677.3	100.00
175-180	0.0	0.00	0-180	1677.3	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.
5. This report cannot be reproduced except in full, without prior written approval of the Company.
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\*\*\*\*\*END OF REPORT\*\*\*\*\*