

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: INFT9.5/827/DIM120V

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	Joker Gu
Report Number:	RKSB200515004-10-1
Test Date:	2020-06-06 to 2020-06-11
Report Date:	2020-06-18
Reviewed By:	Seven Xia/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 2020-05-15 and used for testing.

Model Tested: INFT9.5/827/DIM120V
 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: 120VAC 60Hz
 Rated Power: 27W/21W/17W
 Nominal CCT: 2700K
 Nominal Lumen Output: 3240lm/2520lm/2040lm

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.

Note: All the UUTs were tested at Most Consumptive Settings

5. Test Result

[Integrating Sphere System]

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Downward**

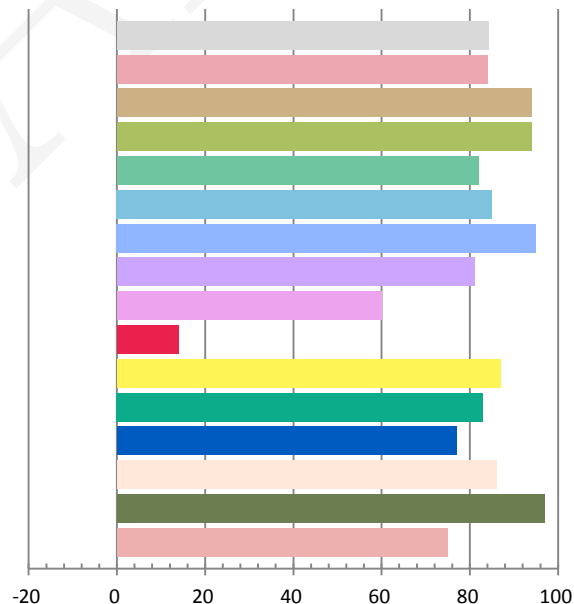
Photometric and Electrical Measurement Result

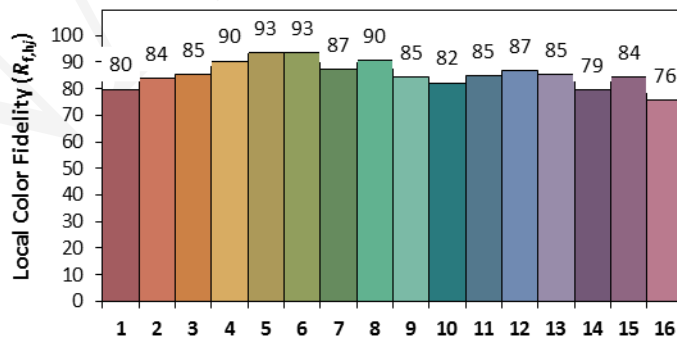
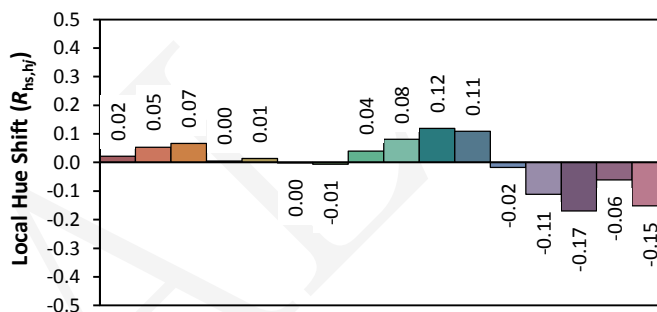
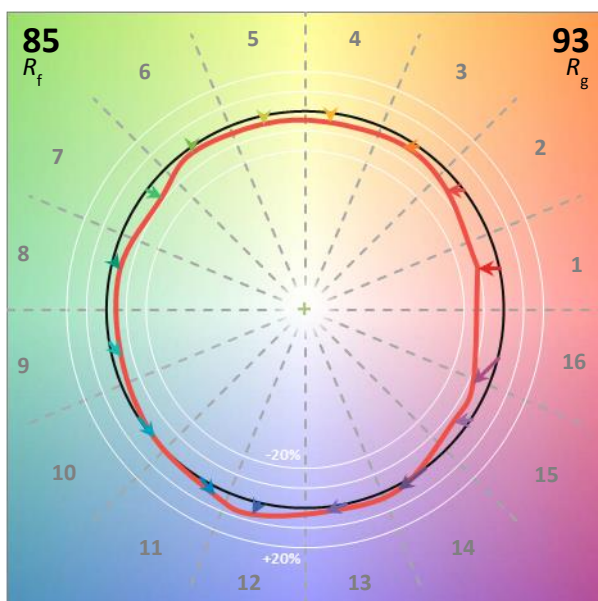
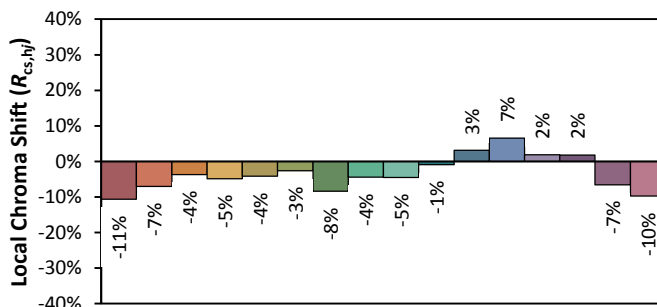
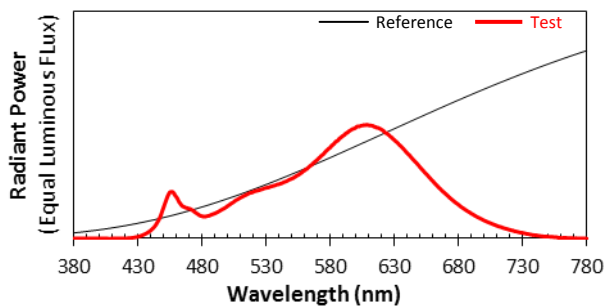
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.04	60	0.2349	27.58	0.9781	3450.8	125.12

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.590	2739	0.00115	0.4587	0.4134	0.2605	0.5282

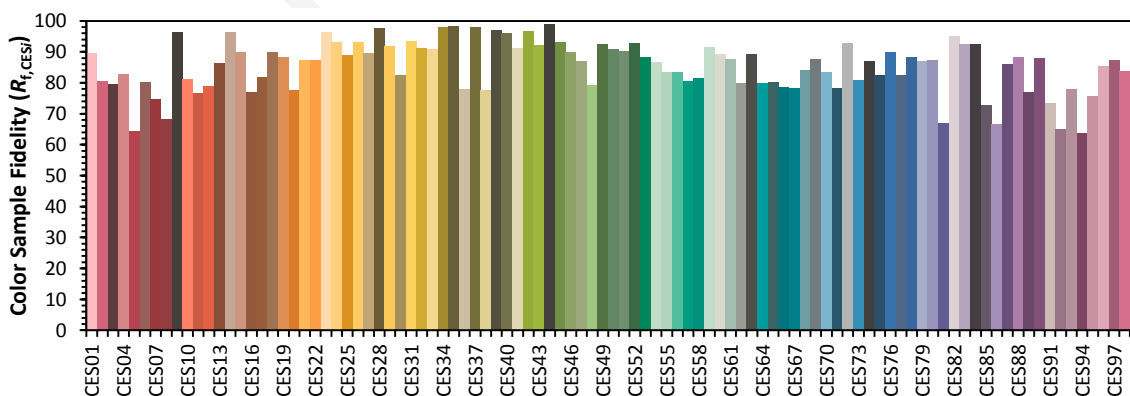
Color Rendering Index

Ra			
84.3			
R1	R2	R3	R4
84	94	94	82
R5	R6	R7	R8
85	95	81	60
R9	R10	R11	R12
14	87	83	77
R13	R14	R15	
86	97	75	

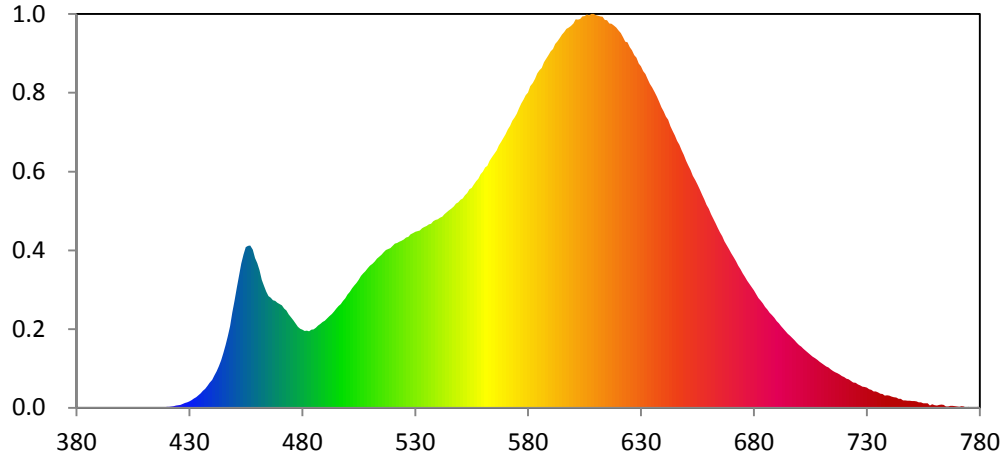




Hue-Angle Bin (j)



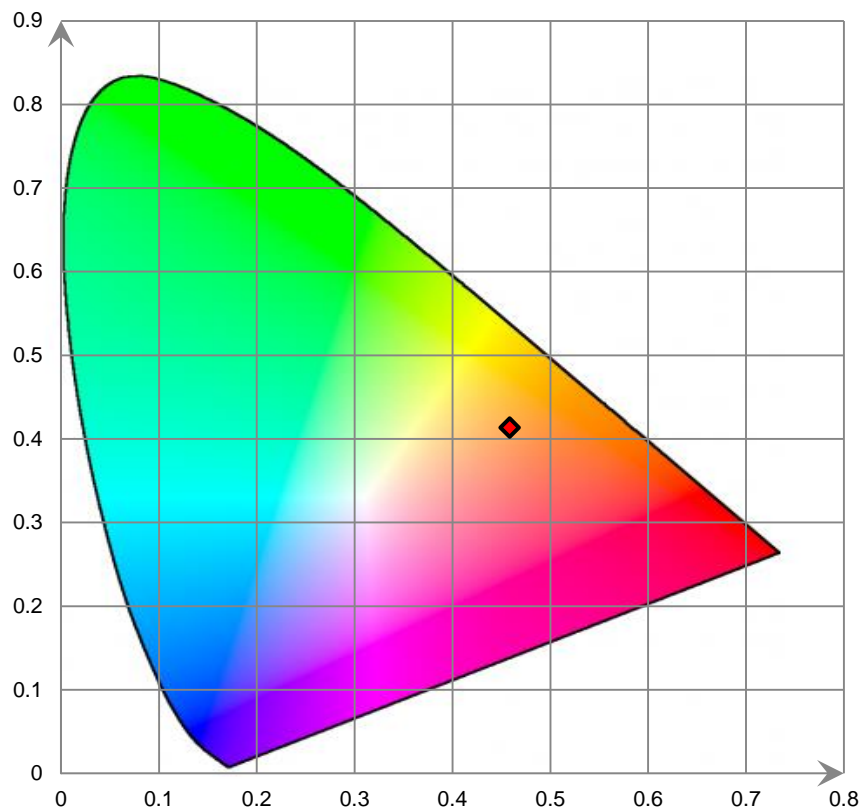
Relative Spectral Power Distribution



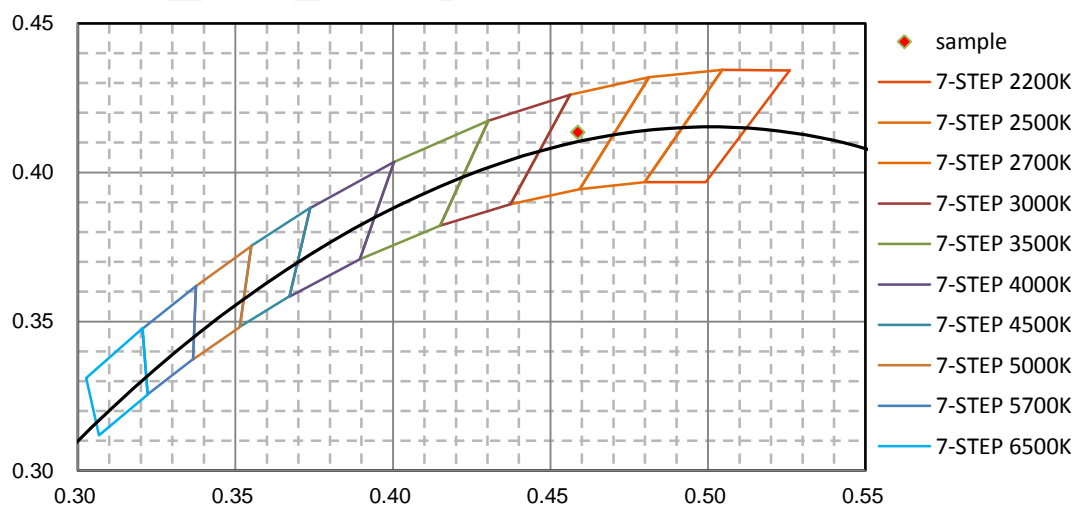
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.000E+00	421	1.955E-01	462	2.462E+01	503	2.351E+01	544	3.763E+01
381	0.000E+00	422	2.672E-01	463	2.346E+01	504	2.403E+01	545	3.796E+01
382	0.000E+00	423	2.707E-01	464	2.232E+01	505	2.461E+01	546	3.828E+01
383	0.000E+00	424	4.312E-01	465	2.150E+01	506	2.537E+01	547	3.874E+01
384	0.000E+00	425	4.909E-01	466	2.116E+01	507	2.587E+01	548	3.927E+01
385	0.000E+00	426	5.759E-01	467	2.065E+01	508	2.629E+01	549	3.954E+01
386	0.000E+00	427	7.151E-01	468	2.055E+01	509	2.682E+01	550	4.001E+01
387	0.000E+00	428	9.033E-01	469	2.018E+01	510	2.731E+01	551	4.024E+01
388	0.000E+00	429	1.066E+00	470	1.994E+01	511	2.770E+01	552	4.089E+01
389	0.000E+00	430	1.226E+00	471	1.971E+01	512	2.813E+01	553	4.128E+01
390	0.000E+00	431	1.496E+00	472	1.910E+01	513	2.865E+01	554	4.206E+01
391	0.000E+00	432	1.792E+00	473	1.874E+01	514	2.902E+01	555	4.230E+01
392	0.000E+00	433	2.054E+00	474	1.797E+01	515	2.943E+01	556	4.300E+01
393	0.000E+00	434	2.392E+00	475	1.738E+01	516	2.991E+01	557	4.361E+01
394	0.000E+00	435	2.782E+00	476	1.679E+01	517	3.036E+01	558	4.408E+01
395	0.000E+00	436	3.230E+00	477	1.619E+01	518	3.054E+01	559	4.490E+01
396	0.000E+00	437	3.651E+00	478	1.555E+01	519	3.073E+01	560	4.540E+01
397	0.000E+00	438	4.201E+00	479	1.519E+01	520	3.112E+01	561	4.620E+01
398	0.000E+00	439	4.799E+00	480	1.499E+01	521	3.158E+01	562	4.655E+01
399	0.000E+00	440	5.361E+00	481	1.477E+01	522	3.171E+01	563	4.751E+01
400	0.000E+00	441	6.202E+00	482	1.480E+01	523	3.197E+01	564	4.824E+01
401	0.000E+00	442	7.016E+00	483	1.472E+01	524	3.215E+01	565	4.887E+01
402	0.000E+00	443	8.016E+00	484	1.502E+01	525	3.236E+01	566	4.948E+01
403	0.000E+00	444	9.095E+00	485	1.510E+01	526	3.275E+01	567	5.050E+01
404	0.000E+00	445	1.054E+01	486	1.538E+01	527	3.284E+01	568	5.114E+01
405	0.000E+00	446	1.203E+01	487	1.581E+01	528	3.336E+01	569	5.191E+01
406	0.000E+00	447	1.380E+01	488	1.614E+01	529	3.362E+01	570	5.265E+01
407	3.270E-02	448	1.569E+01	489	1.646E+01	530	3.384E+01	571	5.355E+01
408	1.900E-03	449	1.836E+01	490	1.671E+01	531	3.400E+01	572	5.420E+01
409	1.880E-02	450	2.060E+01	491	1.716E+01	532	3.407E+01	573	5.522E+01
410	3.500E-03	451	2.310E+01	492	1.757E+01	533	3.454E+01	574	5.581E+01
411	4.300E-03	452	2.541E+01	493	1.806E+01	534	3.477E+01	575	5.656E+01
412	5.400E-03	453	2.777E+01	494	1.855E+01	535	3.498E+01	576	5.764E+01
413	2.000E-04	454	2.949E+01	495	1.910E+01	536	3.528E+01	577	5.852E+01
414	0.000E+00	455	3.091E+01	496	1.956E+01	537	3.541E+01	578	5.929E+01
415	3.200E-03	456	3.113E+01	497	1.994E+01	538	3.590E+01	579	6.012E+01
416	1.460E-02	457	3.121E+01	498	2.053E+01	539	3.611E+01	580	6.061E+01
417	1.740E-02	458	3.042E+01	499	2.104E+01	540	3.624E+01	581	6.187E+01
418	7.670E-02	459	2.880E+01	500	2.177E+01	541	3.655E+01	582	6.250E+01
419	9.980E-02	460	2.783E+01	501	2.227E+01	542	3.677E+01	583	6.327E+01
420	1.502E-01	461	2.647E+01	502	2.294E+01	543	3.723E+01	584	6.431E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	6.496E+01	626	6.878E+01	667	3.202E+01	708	9.210E+00	749	1.338E+00
586	6.536E+01	627	6.783E+01	668	3.127E+01	709	8.871E+00	750	1.268E+00
587	6.651E+01	628	6.731E+01	669	3.051E+01	710	8.549E+00	751	1.269E+00
588	6.718E+01	629	6.624E+01	670	2.973E+01	711	8.228E+00	752	1.219E+00
589	6.786E+01	630	6.570E+01	671	2.893E+01	712	7.959E+00	753	1.064E+00
590	6.857E+01	631	6.478E+01	672	2.817E+01	713	7.763E+00	754	1.063E+00
591	6.901E+01	632	6.421E+01	673	2.731E+01	714	7.396E+00	755	8.675E-01
592	7.000E+01	633	6.324E+01	674	2.666E+01	715	7.065E+00	756	8.632E-01
593	7.046E+01	634	6.229E+01	675	2.586E+01	716	6.809E+00	757	8.392E-01
594	7.110E+01	635	6.164E+01	676	2.520E+01	717	6.623E+00	758	3.951E-01
595	7.177E+01	636	6.069E+01	677	2.443E+01	718	6.386E+00	759	6.748E-01
596	7.224E+01	637	5.982E+01	678	2.383E+01	719	6.069E+00	760	4.926E-01
597	7.286E+01	638	5.884E+01	679	2.319E+01	720	5.915E+00	761	4.478E-01
598	7.314E+01	639	5.778E+01	680	2.257E+01	721	5.593E+00	762	5.791E-01
599	7.345E+01	640	5.700E+01	681	2.185E+01	722	5.458E+00	763	5.989E-01
600	7.396E+01	641	5.602E+01	682	2.114E+01	723	5.141E+00	764	5.333E-01
601	7.475E+01	642	5.539E+01	683	2.061E+01	724	4.840E+00	765	2.595E-01
602	7.469E+01	643	5.416E+01	684	2.007E+01	725	4.767E+00	766	2.480E-01
603	7.480E+01	644	5.325E+01	685	1.940E+01	726	4.483E+00	767	3.431E-01
604	7.526E+01	645	5.236E+01	686	1.888E+01	727	4.283E+00	768	3.632E-01
605	7.533E+01	646	5.132E+01	687	1.829E+01	728	4.035E+00	769	3.274E-01
606	7.565E+01	647	5.062E+01	688	1.784E+01	729	4.024E+00	770	2.212E-01
607	7.548E+01	648	4.957E+01	689	1.729E+01	730	3.873E+00	771	2.030E-01
608	7.576E+01	649	4.864E+01	690	1.668E+01	731	3.555E+00	772	2.776E-01
609	7.576E+01	650	4.751E+01	691	1.623E+01	732	3.473E+00	773	2.286E-01
610	7.554E+01	651	4.657E+01	692	1.572E+01	733	3.159E+00	774	9.270E-02
611	7.538E+01	652	4.574E+01	693	1.518E+01	734	3.110E+00	775	1.745E-01
612	7.529E+01	653	4.465E+01	694	1.468E+01	735	2.952E+00	776	8.620E-02
613	7.522E+01	654	4.375E+01	695	1.425E+01	736	2.700E+00	777	8.580E-02
614	7.461E+01	655	4.289E+01	696	1.383E+01	737	2.634E+00	778	6.910E-02
615	7.452E+01	656	4.195E+01	697	1.340E+01	738	2.315E+00	779	1.624E-01
616	7.391E+01	657	4.097E+01	698	1.296E+01	739	2.428E+00	780	2.550E-02
617	7.390E+01	658	4.010E+01	699	1.250E+01	740	2.299E+00		
618	7.349E+01	659	3.904E+01	700	1.207E+01	741	2.158E+00		
619	7.311E+01	660	3.829E+01	701	1.174E+01	742	2.014E+00		
620	7.259E+01	661	3.727E+01	702	1.134E+01	743	1.958E+00		
621	7.207E+01	662	3.641E+01	703	1.095E+01	744	1.693E+00		
622	7.129E+01	663	3.549E+01	704	1.059E+01	745	1.715E+00		
623	7.044E+01	664	3.457E+01	705	1.023E+01	746	1.428E+00		
624	7.028E+01	665	3.375E+01	706	9.865E+00	747	1.423E+00		
625	6.937E+01	666	3.299E+01	707	9.531E+00	748	1.369E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

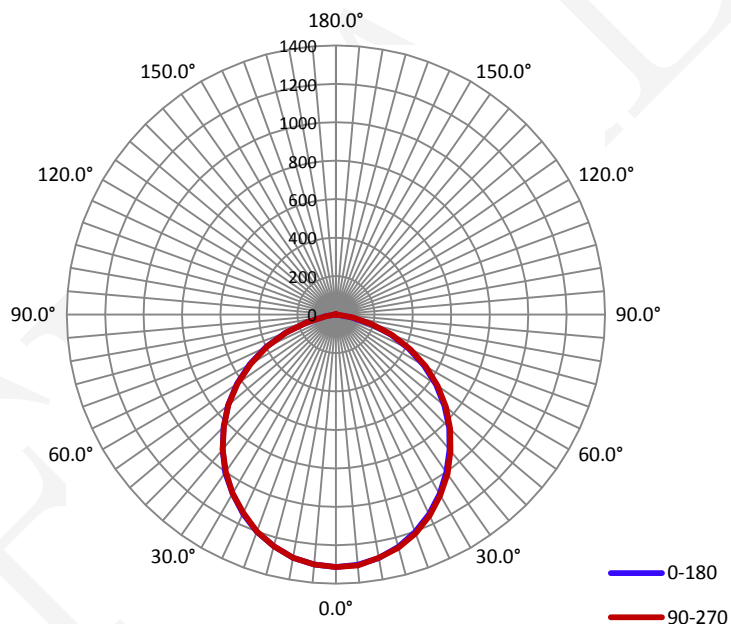
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.2340	27.61	0.9810

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
3458.5	125.31	1312.5	1.22	1.22

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	107.6	107.7	108.0	107.9	107.8
Field Angle(10% I_{max}):	154.3	154.4	154.2	154.2	154.3

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1313	1313	1313	1313	1313	1313	1313	1313
5.0°	1306	1306	1308	1306	1309	1306	1306	1309
10.0°	1285	1287	1287	1287	1284	1286	1286	1288
15.0°	1252	1252	1255	1253	1257	1254	1253	1254
20.0°	1203	1206	1207	1207	1211	1209	1210	1208
25.0°	1146	1147	1150	1149	1154	1151	1149	1150
30.0°	1078	1080	1083	1082	1086	1084	1085	1083
35.0°	1002	1004	1007	1009	1011	1009	1009	1008
40.0°	919	921	926	925	928	928	927	925
45.0°	832	837	837	839	840	839	837	838
50.0°	737	741	743	744	748	746	744	742
55.0°	635	639	642	643	646	645	644	641
60.0°	529	535	537	537	540	538	535	531
65.0°	418	423	427	428	428	423	421	417
70.0°	303	309	312	312	312	308	303	298
75.0°	190	196	199	199	197	194	189	183
80.0°	83	90	92	92	90	87	82	75
85.0°	12	13	15	15	15	14	12	10
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	1	1	0	0
145.0°	0	1	1	1	1	1	1	1
150.0°	1	1	2	1	1	2	2	2
155.0°	2	2	2	2	2	2	2	3
160.0°	2	3	2	3	3	3	3	3
165.0°	2	3	3	3	3	3	3	3
170.0°	3	3	3	3	3	3	4	3
175.0°	3	3	4	4	4	4	4	4
180.0°	0	0	0	0	0	0	0	0

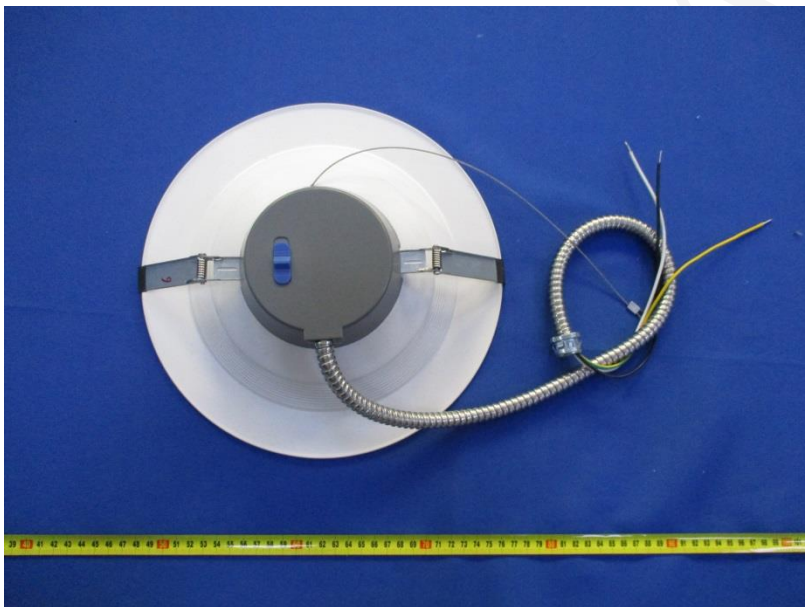
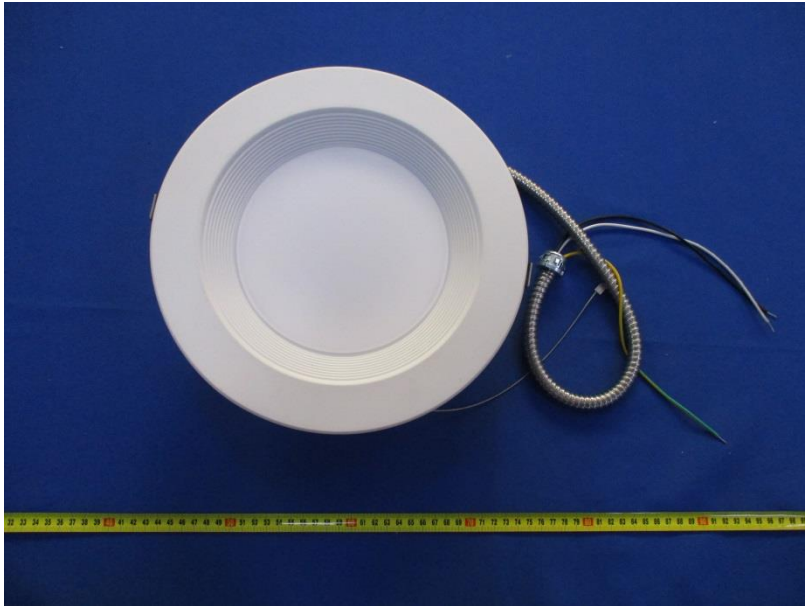
Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	1313	1313	1313	1313	1313	1313	1313	1313
5.0°	1304	1304	1304	1302	1306	1302	1304	1305
10.0°	1284	1283	1284	1281	1284	1281	1283	1284
15.0°	1247	1247	1249	1246	1248	1245	1247	1249
20.0°	1202	1201	1201	1198	1202	1201	1200	1199
25.0°	1144	1142	1143	1140	1139	1138	1141	1142
30.0°	1074	1074	1076	1072	1074	1072	1071	1072
35.0°	1003	999	998	995	998	995	995	997
40.0°	917	915	915	915	916	912	912	914
45.0°	827	827	827	823	825	825	823	825
50.0°	732	730	732	728	729	728	728	730
55.0°	628	626	623	622	624	624	625	628
60.0°	517	513	512	510	512	510	514	518
65.0°	402	397	395	394	395	394	399	404
70.0°	281	278	276	272	274	277	281	286
75.0°	164	160	157	153	155	158	163	170
80.0°	58	53	50	49	51	53	59	66
85.0°	6	6	5	5	6	7	8	10
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	1	1	0	1	1
150.0°	0	0	1	1	1	1	1	1
155.0°	1	1	2	2	2	2	2	2
160.0°	2	2	2	3	2	2	3	3
165.0°	2	2	3	3	3	3	3	3
170.0°	2	3	3	4	4	3	3	4
175.0°	3	3	4	3	4	4	4	4
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	31.3	0.90	0-5	31.3	0.90
5-10	92.7	2.68	0-10	124.0	3.58
10-15	150.4	4.35	0-15	274.3	7.93
15-20	202.3	5.85	0-20	476.6	13.78
20-25	246.4	7.12	0-25	723.0	20.91
25-30	281.3	8.13	0-30	1004.4	29.04
30-35	306.4	8.86	0-35	1310.7	37.90
35-40	320.7	9.27	0-40	1631.4	47.17
40-45	324.2	9.37	0-45	1955.6	56.54
45-50	316.8	9.16	0-50	2272.3	65.70
50-55	297.8	8.61	0-55	2570.2	74.31
55-60	267.6	7.74	0-60	2837.7	82.05
60-65	227.2	6.57	0-65	3064.9	88.62
65-70	178.0	5.15	0-70	3242.9	93.76
70-75	122.6	3.55	0-75	3365.5	97.31
75-80	66.2	1.91	0-80	3431.7	99.22
80-85	21.8	0.63	0-85	3453.5	99.86
85-90	2.7	0.08	0-90	3456.2	99.93
90-95	0.0	0.00	0-95	3456.2	99.93
95-100	0.0	0.00	0-100	3456.2	99.93
100-105	0.0	0.00	0-105	3456.2	99.93
105-110	0.0	0.00	0-110	3456.2	99.93
110-115	0.0	0.00	0-115	3456.2	99.93
115-120	0.0	0.00	0-120	3456.2	99.93
120-125	0.0	0.00	0-125	3456.2	99.93
125-130	0.0	0.00	0-130	3456.2	99.93
130-135	0.0	0.00	0-135	3456.2	99.93
135-140	0.0	0.00	0-140	3456.2	99.93
140-145	0.1	0.00	0-145	3456.3	99.94
145-150	0.3	0.01	0-150	3456.6	99.95
150-155	0.4	0.01	0-155	3457.0	99.96
155-160	0.4	0.01	0-160	3457.5	99.97
160-165	0.4	0.01	0-165	3457.9	99.98
165-170	0.4	0.01	0-170	3458.2	99.99
170-175	0.2	0.01	0-175	3458.5	100.00
175-180	0.0	0.00	0-180	3458.5	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.
6. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

*****END OF REPORT*****