

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: INFT8/835/DIM010UNV

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Test Engineer:	George Yang
Report Number:	PKS200825089-10
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: INFT8/835/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: 3500K
 Nominal Lumen Output: 2090lm

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**

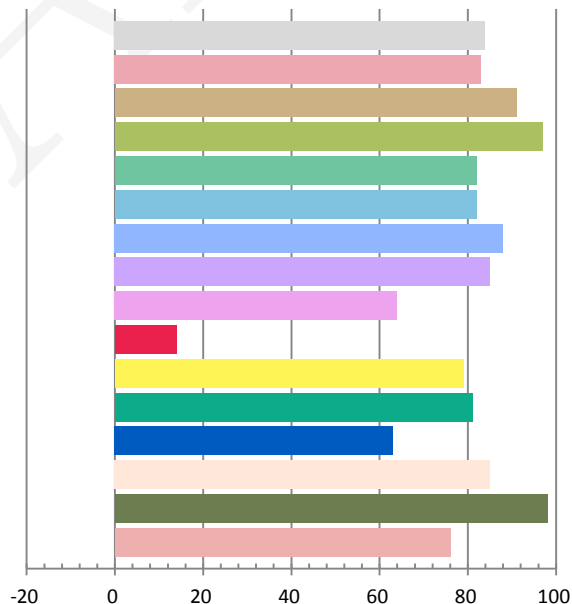
Photometric and Electrical Measurement Result

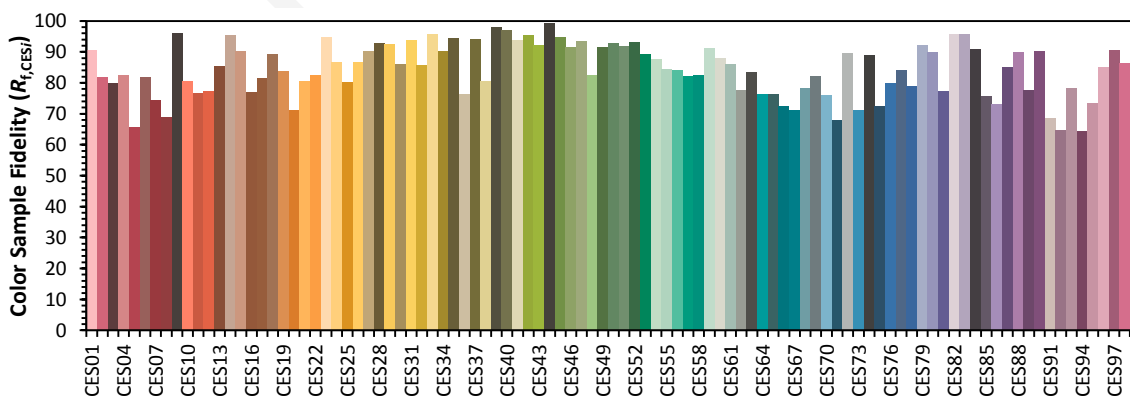
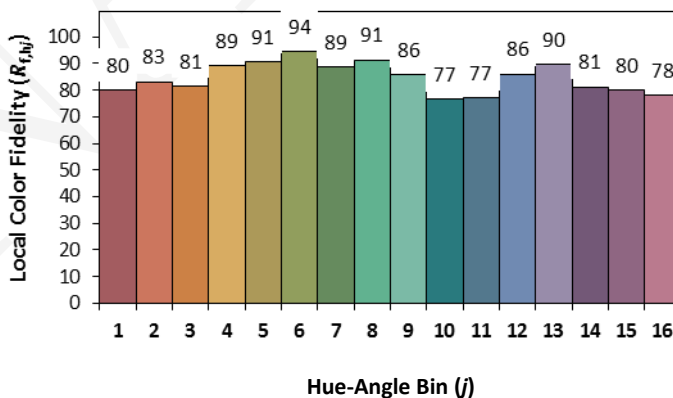
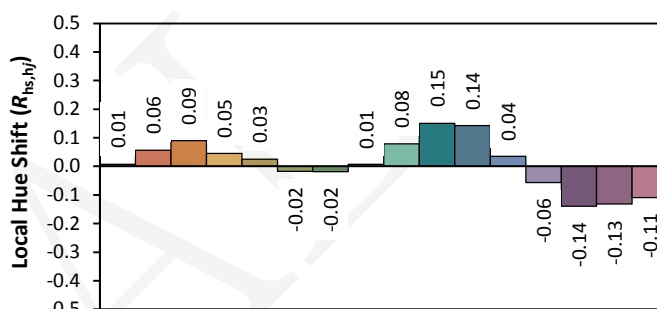
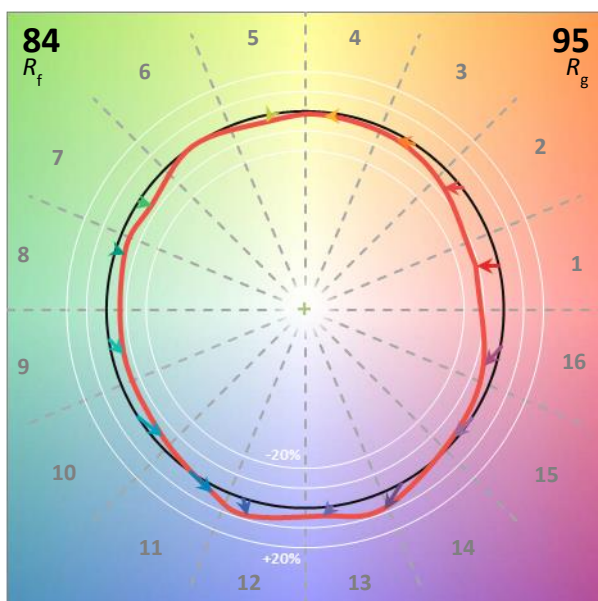
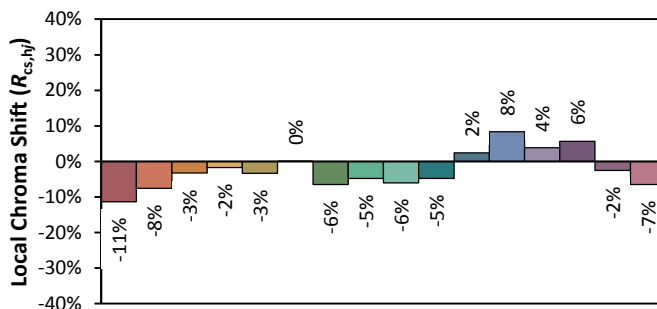
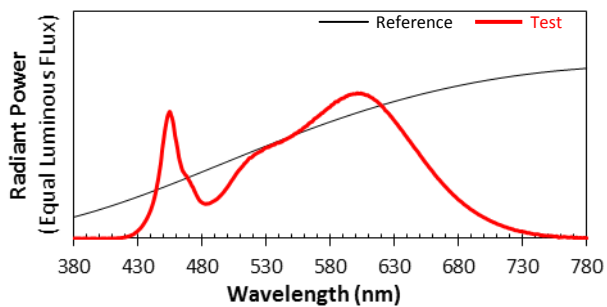
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120	60	0.1502	17.55	0.9737	2283.37	130.11

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
6.868	3430	0.00088	0.4102	0.3952	0.2371	0.5138

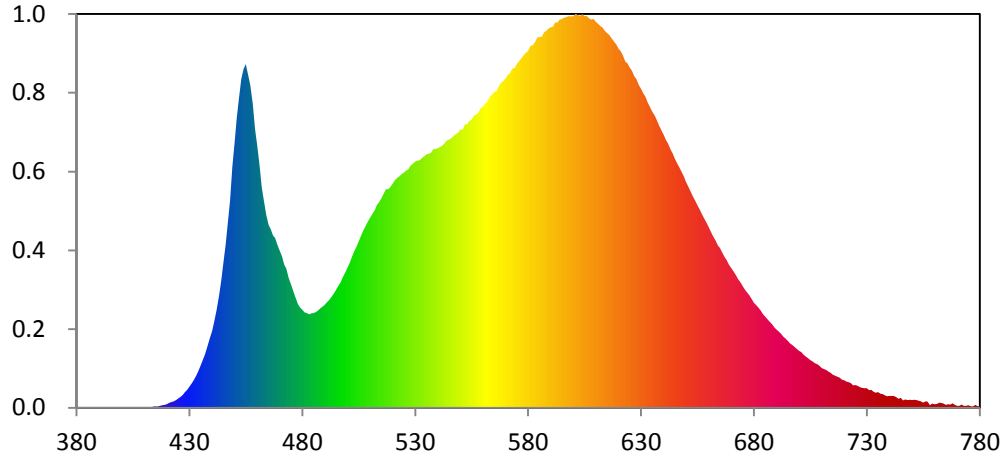
Color Rendering Index

Ra			
83.9			
R1	R2	R3	R4
83	91	97	82
R5	R6	R7	R8
82	88	85	64
R9	R10	R11	R12
14	79	81	63
R13	R14	R15	
85	98	76	





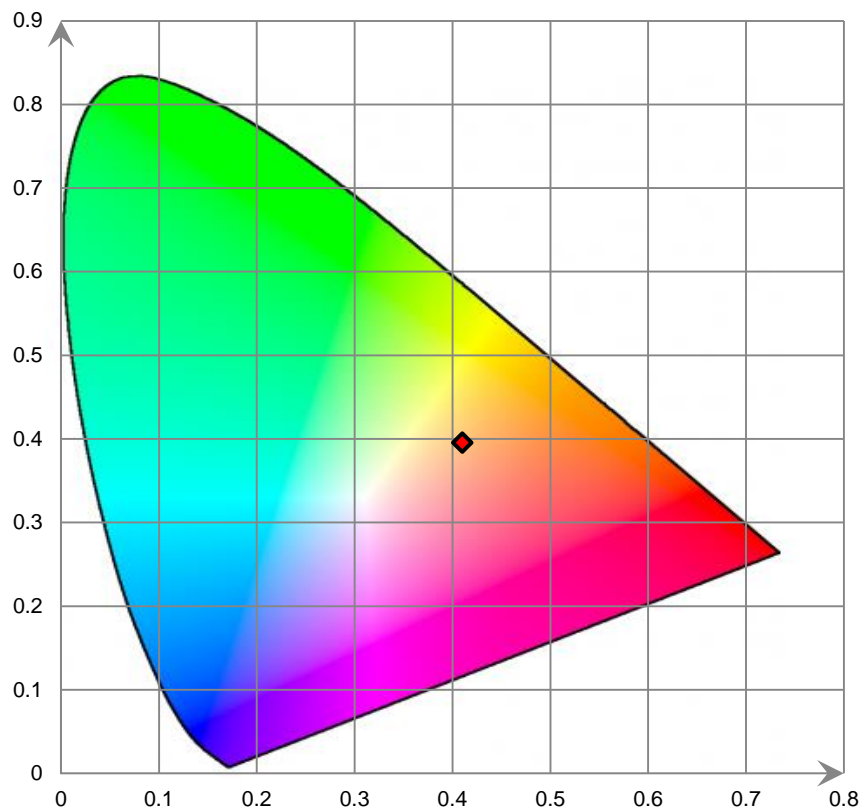
Relative Spectral Power Distribution



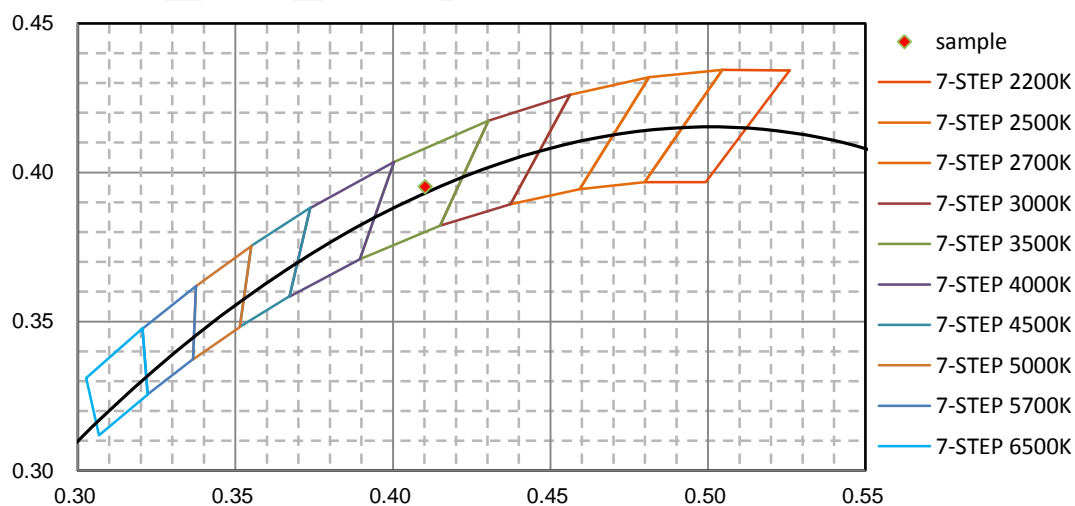
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.690E-02	421	5.093E-01	462	2.392E+01	503	1.699E+01	544	2.899E+01
381	4.990E-02	422	6.074E-01	463	2.239E+01	504	1.747E+01	545	2.910E+01
382	2.470E-02	423	7.073E-01	464	2.095E+01	505	1.806E+01	546	2.926E+01
383	2.000E-02	424	8.340E-01	465	1.989E+01	506	1.864E+01	547	2.951E+01
384	5.690E-02	425	1.015E+00	466	1.937E+01	507	1.922E+01	548	2.970E+01
385	5.180E-02	426	1.169E+00	467	1.873E+01	508	1.969E+01	549	2.986E+01
386	3.400E-03	427	1.383E+00	468	1.840E+01	509	2.019E+01	550	3.020E+01
387	3.740E-02	428	1.697E+00	469	1.769E+01	510	2.059E+01	551	3.019E+01
388	3.540E-02	429	1.958E+00	470	1.707E+01	511	2.104E+01	552	3.077E+01
389	6.010E-02	430	2.280E+00	471	1.645E+01	512	2.142E+01	553	3.079E+01
390	6.410E-02	431	2.653E+00	472	1.557E+01	513	2.202E+01	554	3.115E+01
391	2.680E-02	432	3.009E+00	473	1.509E+01	514	2.233E+01	555	3.128E+01
392	7.200E-03	433	3.478E+00	474	1.411E+01	515	2.275E+01	556	3.172E+01
393	7.500E-03	434	3.990E+00	475	1.334E+01	516	2.322E+01	557	3.181E+01
394	1.200E-03	435	4.597E+00	476	1.259E+01	517	2.371E+01	558	3.204E+01
395	4.920E-02	436	5.214E+00	477	1.190E+01	518	2.374E+01	559	3.252E+01
396	2.280E-02	437	5.849E+00	478	1.126E+01	519	2.398E+01	560	3.268E+01
397	2.640E-02	438	6.622E+00	479	1.087E+01	520	2.432E+01	561	3.304E+01
398	9.000E-04	439	7.454E+00	480	1.062E+01	521	2.471E+01	562	3.317E+01
399	1.450E-02	440	8.339E+00	481	1.036E+01	522	2.492E+01	563	3.371E+01
400	4.000E-04	441	9.438E+00	482	1.028E+01	523	2.513E+01	564	3.400E+01
401	3.110E-02	442	1.064E+01	483	1.014E+01	524	2.535E+01	565	3.427E+01
402	6.880E-02	443	1.205E+01	484	1.026E+01	525	2.552E+01	566	3.438E+01
403	2.710E-02	444	1.369E+01	485	1.027E+01	526	2.574E+01	567	3.492E+01
404	3.330E-02	445	1.570E+01	486	1.038E+01	527	2.586E+01	568	3.530E+01
405	2.710E-02	446	1.766E+01	487	1.056E+01	528	2.629E+01	569	3.547E+01
406	1.360E-02	447	2.007E+01	488	1.079E+01	529	2.651E+01	570	3.579E+01
407	7.450E-02	448	2.251E+01	489	1.099E+01	530	2.675E+01	571	3.611E+01
408	3.390E-02	449	2.611E+01	490	1.117E+01	531	2.681E+01	572	3.634E+01
409	5.310E-02	450	2.872E+01	491	1.146E+01	532	2.689E+01	573	3.681E+01
410	7.290E-02	451	3.151E+01	492	1.169E+01	533	2.713E+01	574	3.687E+01
411	5.230E-02	452	3.368E+01	493	1.208E+01	534	2.731E+01	575	3.729E+01
412	7.010E-02	453	3.569E+01	494	1.244E+01	535	2.749E+01	576	3.762E+01
413	2.130E-02	454	3.675E+01	495	1.284E+01	536	2.758E+01	577	3.794E+01
414	1.257E-01	455	3.730E+01	496	1.327E+01	537	2.767E+01	578	3.826E+01
415	1.490E-01	456	3.619E+01	497	1.364E+01	538	2.806E+01	579	3.852E+01
416	1.382E-01	457	3.505E+01	498	1.421E+01	539	2.810E+01	580	3.869E+01
417	2.074E-01	458	3.299E+01	499	1.469E+01	540	2.817E+01	581	3.925E+01
418	2.654E-01	459	3.024E+01	500	1.522E+01	541	2.831E+01	582	3.936E+01
419	3.268E-01	460	2.841E+01	501	1.574E+01	542	2.844E+01	583	3.972E+01
420	3.931E-01	461	2.635E+01	502	1.638E+01	543	2.869E+01	584	4.019E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	4.025E+01	626	3.657E+01	667	1.641E+01	708	4.737E+00	749	8.531E-01
586	4.024E+01	627	3.599E+01	668	1.600E+01	709	4.535E+00	750	8.160E-01
587	4.076E+01	628	3.566E+01	669	1.554E+01	710	4.316E+00	751	8.631E-01
588	4.092E+01	629	3.507E+01	670	1.517E+01	711	4.199E+00	752	8.192E-01
589	4.116E+01	630	3.464E+01	671	1.477E+01	712	4.077E+00	753	7.653E-01
590	4.129E+01	631	3.413E+01	672	1.437E+01	713	3.932E+00	754	6.921E-01
591	4.139E+01	632	3.375E+01	673	1.393E+01	714	3.775E+00	755	5.394E-01
592	4.182E+01	633	3.314E+01	674	1.362E+01	715	3.591E+00	756	6.773E-01
593	4.182E+01	634	3.265E+01	675	1.320E+01	716	3.455E+00	757	6.730E-01
594	4.215E+01	635	3.216E+01	676	1.282E+01	717	3.379E+00	758	2.849E-01
595	4.219E+01	636	3.172E+01	677	1.250E+01	718	3.250E+00	759	4.622E-01
596	4.234E+01	637	3.119E+01	678	1.218E+01	719	3.062E+00	760	3.796E-01
597	4.241E+01	638	3.060E+01	679	1.179E+01	720	3.003E+00	761	4.183E-01
598	4.251E+01	639	3.012E+01	680	1.139E+01	721	2.837E+00	762	5.422E-01
599	4.248E+01	640	2.962E+01	681	1.114E+01	722	2.787E+00	763	5.258E-01
600	4.251E+01	641	2.907E+01	682	1.085E+01	723	2.658E+00	764	4.466E-01
601	4.275E+01	642	2.867E+01	683	1.057E+01	724	2.442E+00	765	3.165E-01
602	4.261E+01	643	2.806E+01	684	1.017E+01	725	2.472E+00	766	3.906E-01
603	4.256E+01	644	2.761E+01	685	9.885E+00	726	2.357E+00	767	3.485E-01
604	4.271E+01	645	2.704E+01	686	9.617E+00	727	2.210E+00	768	4.687E-01
605	4.253E+01	646	2.652E+01	687	9.346E+00	728	2.147E+00	769	3.227E-01
606	4.250E+01	647	2.608E+01	688	9.111E+00	729	2.115E+00	770	2.167E-01
607	4.226E+01	648	2.561E+01	689	8.706E+00	730	2.101E+00	771	2.129E-01
608	4.213E+01	649	2.511E+01	690	8.479E+00	731	1.920E+00	772	3.508E-01
609	4.219E+01	650	2.448E+01	691	8.251E+00	732	1.929E+00	773	1.982E-01
610	4.190E+01	651	2.399E+01	692	8.022E+00	733	1.738E+00	774	2.122E-01
611	4.167E+01	652	2.349E+01	693	7.723E+00	734	1.630E+00	775	2.635E-01
612	4.145E+01	653	2.297E+01	694	7.512E+00	735	1.685E+00	776	1.773E-01
613	4.128E+01	654	2.244E+01	695	7.267E+00	736	1.524E+00	777	1.411E-01
614	4.090E+01	655	2.196E+01	696	6.978E+00	737	1.498E+00	778	3.124E-01
615	4.067E+01	656	2.150E+01	697	6.815E+00	738	1.369E+00	779	1.519E-01
616	4.047E+01	657	2.099E+01	698	6.611E+00	739	1.237E+00	780	1.689E-01
617	4.013E+01	658	2.053E+01	699	6.385E+00	740	1.285E+00		
618	3.975E+01	659	2.007E+01	700	6.180E+00	741	1.265E+00		
619	3.944E+01	660	1.959E+01	701	6.040E+00	742	1.270E+00		
620	3.896E+01	661	1.907E+01	702	5.769E+00	743	1.160E+00		
621	3.869E+01	662	1.857E+01	703	5.566E+00	744	9.759E-01		
622	3.821E+01	663	1.817E+01	704	5.394E+00	745	1.060E+00		
623	3.759E+01	664	1.764E+01	705	5.178E+00	746	8.133E-01		
624	3.737E+01	665	1.732E+01	706	5.044E+00	747	8.951E-01		
625	3.693E+01	666	1.684E+01	707	4.825E+00	748	8.427E-01		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

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

Test orientation: **Downward**

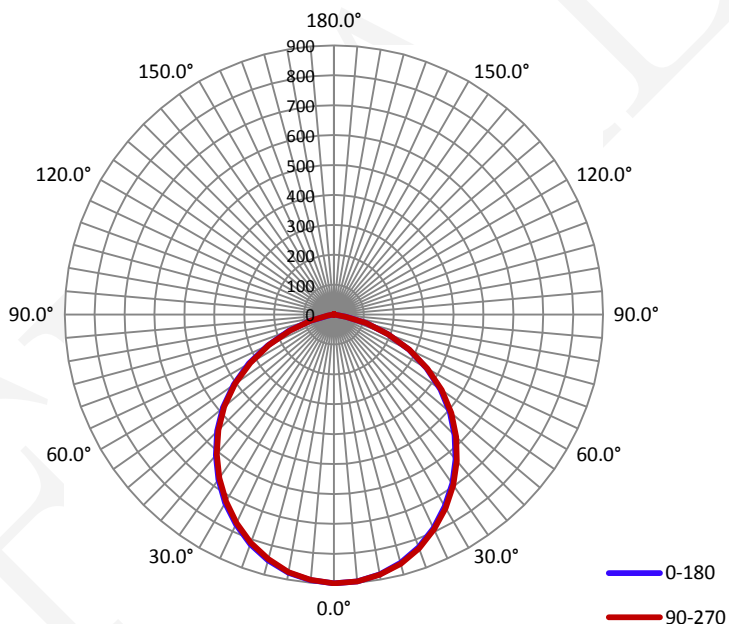
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1500	17.64	0.9780

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
2296.1	130.21	898.3	1.22	1.22

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	106.4	106.6	106.4	106.4	106.5
Field Angle(10% I_{max}):	151.2	151.2	150.9	151.1	151.1

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	898	898	898	898	898	898	898	898
5.0°	895	896	896	896	895	895	895	895
10.0°	882	884	884	885	884	883	882	880
15.0°	860	862	863	863	863	861	858	856
20.0°	828	832	833	834	832	830	827	823
25.0°	789	793	794	794	792	791	786	782
30.0°	742	746	749	749	748	745	739	734
35.0°	690	694	697	698	696	693	688	681
40.0°	633	638	641	641	640	636	629	624
45.0°	571	577	580	580	578	575	569	562
50.0°	506	512	516	516	513	509	504	497
55.0°	436	441	444	444	441	436	430	423
60.0°	357	362	364	364	361	356	348	342
65.0°	276	280	281	282	278	273	265	259
70.0°	191	195	198	198	194	188	183	176
75.0°	113	117	119	117	113	109	105	98
80.0°	42	46	47	44	40	38	36	33
85.0°	8	8	8	8	7	6	6	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	1	0	0	1	0	1
160.0°	0	0	1	1	1	1	1	1
165.0°	1	1	1	1	1	1	1	1
170.0°	1	1	1	1	2	2	1	2
175.0°	1	1	2	2	2	2	1	2
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

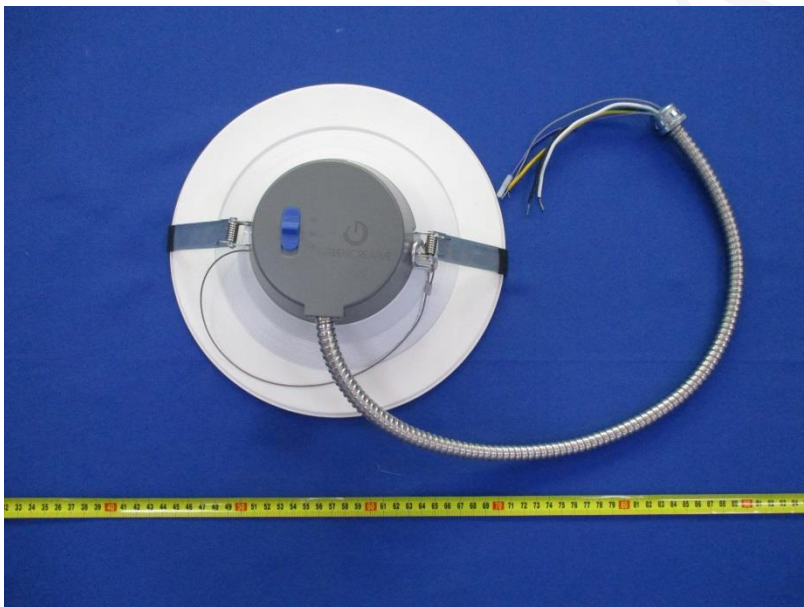
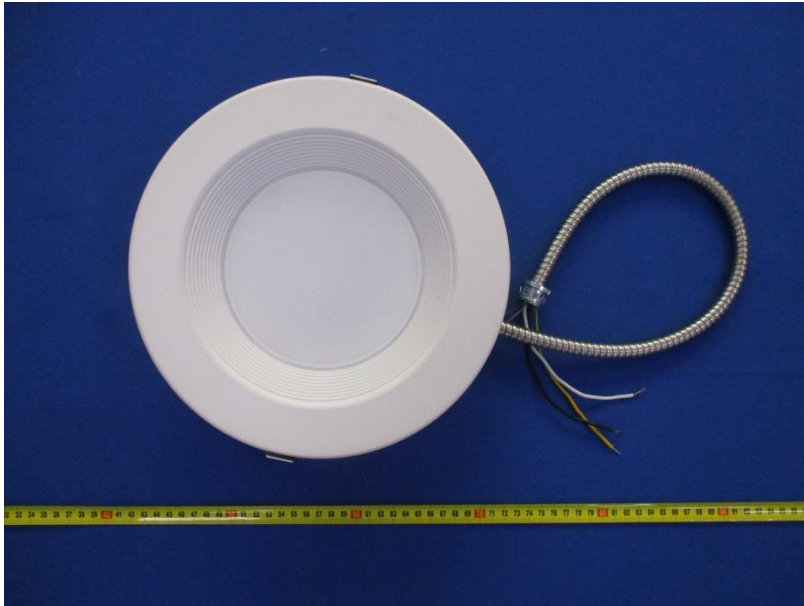
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	898	898	898	898	898	898	898	898
5.0°	891	891	890	890	890	892	892	894
10.0°	877	874	872	872	874	875	877	880
15.0°	850	848	846	845	847	849	852	855
20.0°	817	813	811	810	812	815	818	823
25.0°	774	772	769	768	770	773	777	782
30.0°	727	724	721	720	721	725	730	734
35.0°	673	669	666	665	667	670	676	682
40.0°	615	611	607	607	609	612	617	625
45.0°	551	548	545	544	546	551	555	562
50.0°	484	480	478	476	479	483	488	496
55.0°	409	404	402	400	403	409	414	423
60.0°	328	324	319	320	322	327	335	343
65.0°	244	240	235	236	239	244	251	260
70.0°	161	156	154	153	156	162	168	176
75.0°	83	79	78	77	80	85	90	97
80.0°	22	20	18	19	21	22	26	31
85.0°	3	3	3	3	4	4	5	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	1	0	0
160.0°	0	0	1	1	1	1	1	0
165.0°	0	1	1	1	1	1	1	1
170.0°	1	1	1	2	1	2	2	2
175.0°	1	1	2	2	1	2	2	2
180.0°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	21.4	0.93
5-10	63.4	2.76
10-15	102.9	4.48
15-20	138.2	6.02
20-25	168.2	7.33
25-30	191.8	8.36
30-35	208.5	9.08
35-40	217.8	9.49
40-45	219.6	9.57
45-50	213.8	9.31
50-55	199.7	8.70
55-60	176.7	7.70
60-65	146.1	6.36
65-70	110.0	4.79
70-75	71.3	3.11
75-80	34.5	1.50
80-85	10.0	0.44
85-90	1.5	0.06
90-95	0.0	0.00
95-100	0.0	0.00
100-105	0.0	0.00
105-110	0.0	0.00
110-115	0.0	0.00
115-120	0.0	0.00
120-125	0.0	0.00
125-130	0.0	0.00
130-135	0.0	0.00
135-140	0.0	0.00
140-145	0.0	0.00
145-150	0.0	0.00
150-155	0.0	0.00
155-160	0.1	0.00
160-165	0.1	0.01
165-170	0.1	0.01
170-175	0.1	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	21.4	0.93
0-10	84.8	3.69
0-15	187.7	8.17
0-20	325.9	14.19
0-25	494.1	21.52
0-30	685.9	29.87
0-35	894.5	38.96
0-40	1112.3	48.44
0-45	1331.9	58.01
0-50	1545.8	67.32
0-55	1745.5	76.02
0-60	1922.2	83.72
0-65	2068.3	90.08
0-70	2178.3	94.87
0-75	2249.6	97.98
0-80	2284.1	99.48
0-85	2294.1	99.91
0-90	2295.6	99.98
0-95	2295.6	99.98
0-100	2295.6	99.98
0-105	2295.6	99.98
0-110	2295.6	99.98
0-115	2295.6	99.98
0-120	2295.6	99.98
0-125	2295.6	99.98
0-130	2295.6	99.98
0-135	2295.6	99.98
0-140	2295.6	99.98
0-145	2295.6	99.98
0-150	2295.6	99.98
0-155	2295.6	99.98
0-160	2295.7	99.98
0-165	2295.8	99.99
0-170	2296.0	99.99
0-175	2296.1	100.00
0-180	2296.1	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*****