



TL-749



IES LM-79-08

MEASUREMENT AND TEST REPORT

For

LED One Corporation

12437 Belgrave Ave, Eastvale, CA 91752

Test Model: LOC-4DL-MW(5.5/8/12)MCCT(30/40/50)D

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution
Project Engineer:	Bay Wang
Report Number:	RKSB210216035-10
Test Date:	2020-09-03
Report Date:	2021-02-26
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 2020-08-24 and used for testing.

Model Tested:	LOC-4DL-MW(5.5/8/12)MCCT(30/40/50)D
Manufacturer:	LED One Corporation
Brand Name:	LED One
Product Designation:	LED Recessed Downlight
Burning Time Before Test:	0hour(For New Products)
Color Tunable:	White-Tunable
CCT Range:	3000K, 3500K, 4000K
Least Efficient Setting:	3000K
Most Consumptive Setting:	4000K
Default Setting:	4000K

Rated Values:

Rated Voltage/Frequency:	120-347V 60Hz
Rated Power:	5.5W/8W/12W
Nominal CCT:	3000K, 3500K, 4000K
Nominal Lumen Output:	1000lm

Note:

1. The applicant *LED One Corporation* declared that their products are the same to the product in report# RKS200824001-10-2 and is authorized by original applicant to use their test data.
2. All the data in previous report (RKS200824001-10-2) is shared in report.

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
2.0m integrating sphere	EVERFINE	R98	G121960CS1361154D	2019-12-24	2020-12-23
spectroradiometer	EVERFINE	HAAS-2000	M12048CS1361148	2019-12-24	2020-12-23
Digital CC&CV DC Power Supply	EVERFINE	WY305	G115986CN1361134	2019-12-20	2020-12-19
Temperature/humidity/clock	KEJIAN	TA298	EE053	2019-12-02	2020-12-01
Standard Light Source	INVENTFINE	N/A	JWWCR020106	2019-11-19	2020-11-18
Digital Power Meter	YOKOGAWA	WT210	91KB35700	2020-04-02	2021-04-01
Intelligence ac power supply	EVERFINE	DPS1005	G119890CS1361121	2020-04-02	2021-04-01

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
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
Variable-Voltage Transformer	Guangfa	TDGC2-1KVA	N/A	N/A	N/A

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 $U_{rel}=2.70\%$ ($k=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=27\text{K}$ ($k=2$), at the 95% confidence level. The uncertainty of the CRI is $U=2.7(k=2)$, at the 95% confidence level.

The uncertainty of power meter AC current $U_{rel}=0.27\%$ of rdg, AC Voltage $U_{rel}=0.26\%$ of rdg, Power $U_{rel}=0.41\%$ ($k=2$), 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 $U_{rel}=2.6\%$ ($k=2$), 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]

Control Setting: 3000K

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

Test orientation: **Downward**

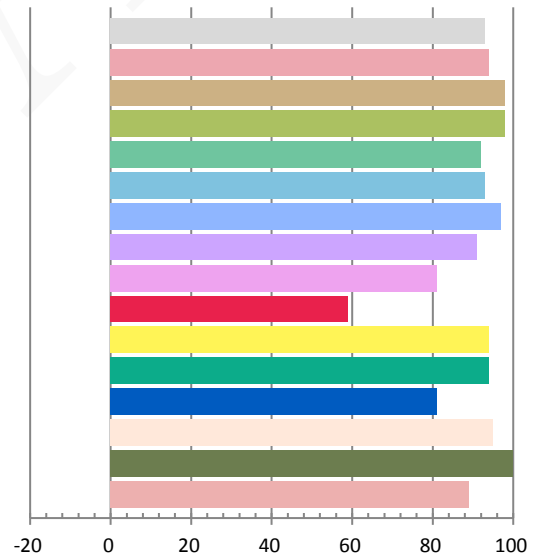
Photometric and Electrical Measurement Result

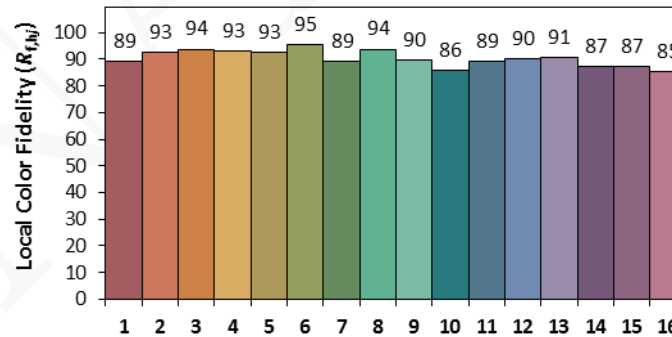
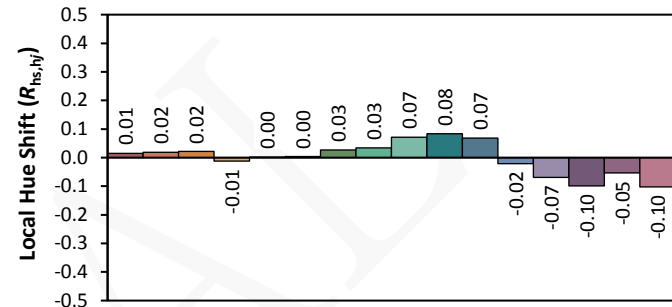
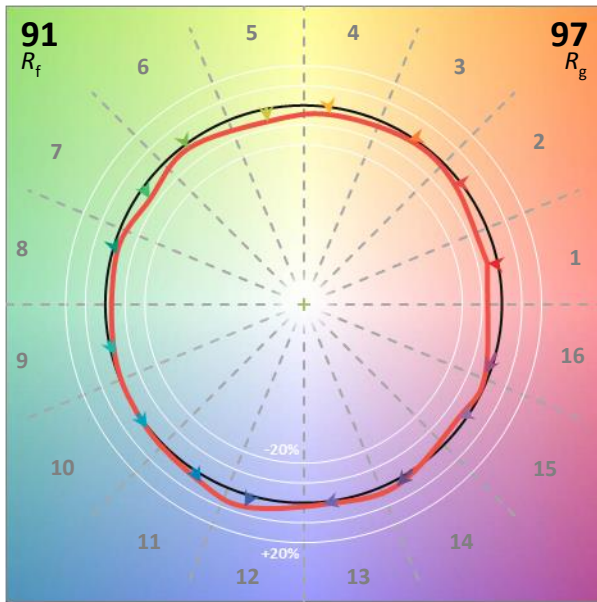
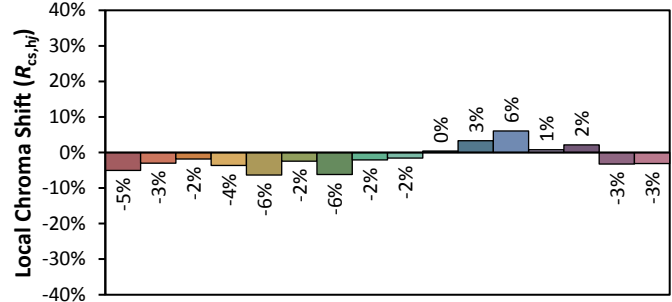
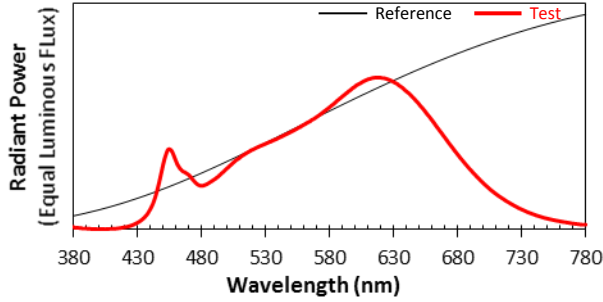
Voltage(V)	Frequency(Hz)	Current(A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy(lm/W)
120.1	60	0.0999	11.74	0.9786	1024.3	87.27

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
3.506	3068	0.00095	0.4336	0.4053	0.2479	0.5213

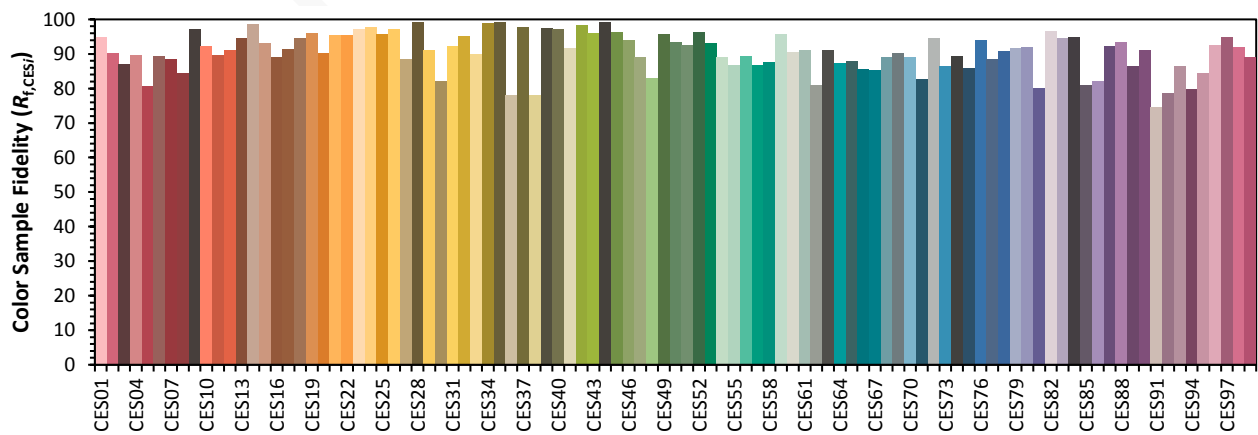
Color Rendering Index

Ra			
93.1			
R1	R2	R3	R4
94	98	98	92
R5	R6	R7	R8
93	97	91	81
R9	R10	R11	R12
59	94	94	81
R13	R14	R15	
95	100	89	

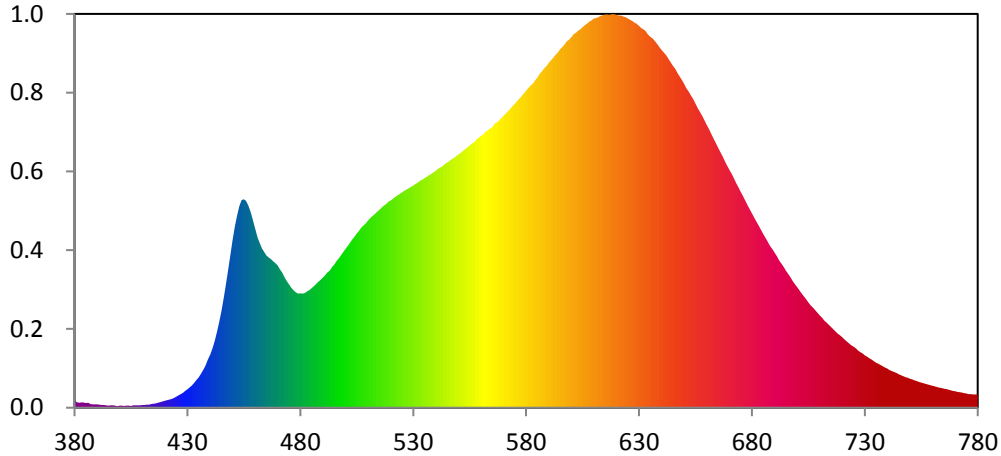




Hue-Angle Bin (j)



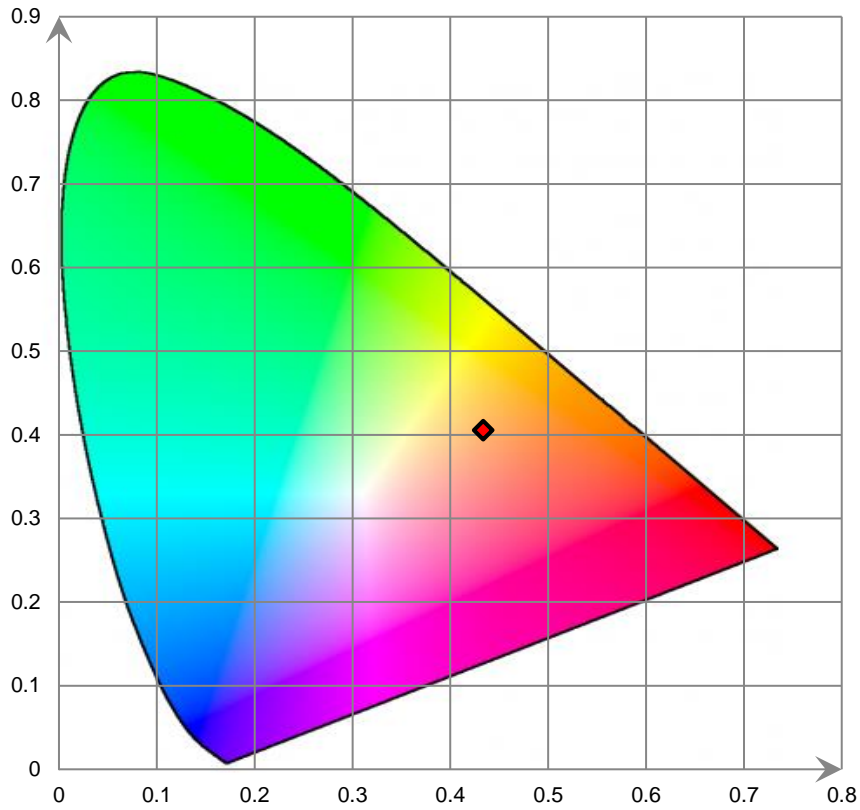
Relative Spectral Power Distribution



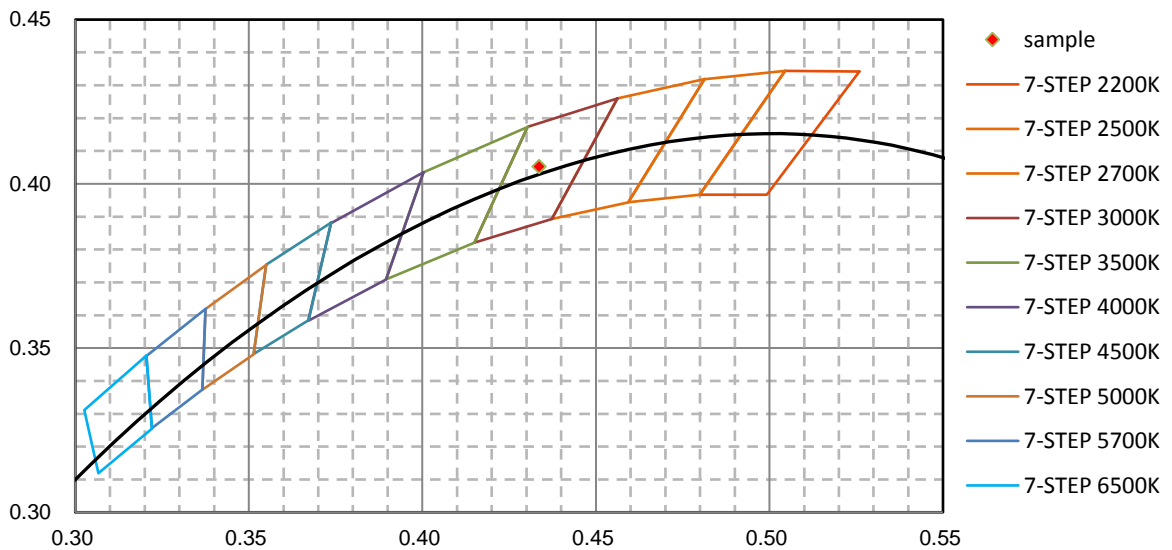
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.048E-01	421	3.875E-01	462	8.432E+00	503	8.604E+00	544	1.247E+01
381	2.845E-01	422	4.199E-01	463	8.156E+00	504	8.765E+00	545	1.255E+01
382	2.561E-01	423	4.549E-01	464	7.977E+00	505	8.918E+00	546	1.263E+01
383	2.782E-01	424	5.044E-01	465	7.787E+00	506	9.045E+00	547	1.271E+01
384	2.637E-01	425	5.674E-01	466	7.687E+00	507	9.215E+00	548	1.279E+01
385	2.453E-01	426	6.255E-01	467	7.617E+00	508	9.328E+00	549	1.288E+01
386	2.474E-01	427	6.914E-01	468	7.502E+00	509	9.428E+00	550	1.297E+01
387	1.856E-01	428	7.626E-01	469	7.389E+00	510	9.569E+00	551	1.305E+01
388	1.695E-01	429	8.571E-01	470	7.282E+00	511	9.715E+00	552	1.315E+01
389	1.688E-01	430	9.421E-01	471	7.093E+00	512	9.819E+00	553	1.324E+01
390	1.791E-01	431	1.043E+00	472	6.915E+00	513	9.919E+00	554	1.332E+01
391	1.585E-01	432	1.144E+00	473	6.685E+00	514	1.003E+01	555	1.342E+01
392	1.470E-01	433	1.271E+00	474	6.492E+00	515	1.014E+01	556	1.353E+01
393	1.455E-01	434	1.412E+00	475	6.302E+00	516	1.024E+01	557	1.359E+01
394	1.196E-01	435	1.555E+00	476	6.137E+00	517	1.034E+01	558	1.372E+01
395	1.045E-01	436	1.725E+00	477	6.008E+00	518	1.043E+01	559	1.381E+01
396	1.161E-01	437	1.922E+00	478	5.908E+00	519	1.055E+01	560	1.392E+01
397	1.182E-01	438	2.138E+00	479	5.845E+00	520	1.060E+01	561	1.398E+01
398	1.087E-01	439	2.432E+00	480	5.855E+00	521	1.069E+01	562	1.412E+01
399	8.121E-02	440	2.719E+00	481	5.839E+00	522	1.079E+01	563	1.420E+01
400	1.006E-01	441	3.026E+00	482	5.875E+00	523	1.087E+01	564	1.430E+01
401	1.138E-01	442	3.402E+00	483	5.956E+00	524	1.094E+01	565	1.436E+01
402	9.222E-02	443	3.851E+00	484	6.016E+00	525	1.102E+01	566	1.454E+01
403	1.151E-01	444	4.364E+00	485	6.126E+00	526	1.110E+01	567	1.461E+01
404	1.103E-01	445	4.922E+00	486	6.219E+00	527	1.116E+01	568	1.470E+01
405	9.118E-02	446	5.575E+00	487	6.337E+00	528	1.124E+01	569	1.483E+01
406	1.224E-01	447	6.291E+00	488	6.444E+00	529	1.131E+01	570	1.495E+01
407	1.184E-01	448	7.043E+00	489	6.549E+00	530	1.138E+01	571	1.506E+01
408	1.286E-01	449	7.799E+00	490	6.661E+00	531	1.146E+01	572	1.518E+01
409	1.311E-01	450	8.571E+00	491	6.773E+00	532	1.153E+01	573	1.530E+01
410	1.361E-01	451	9.267E+00	492	6.925E+00	533	1.162E+01	574	1.543E+01
411	1.425E-01	452	9.824E+00	493	7.020E+00	534	1.166E+01	575	1.556E+01
412	1.524E-01	453	1.032E+01	494	7.193E+00	535	1.176E+01	576	1.570E+01
413	1.581E-01	454	1.062E+01	495	7.338E+00	536	1.183E+01	577	1.582E+01
414	1.807E-01	455	1.067E+01	496	7.506E+00	537	1.191E+01	578	1.595E+01
415	1.975E-01	456	1.059E+01	497	7.648E+00	538	1.197E+01	579	1.607E+01
416	2.223E-01	457	1.036E+01	498	7.812E+00	539	1.204E+01	580	1.622E+01
417	2.502E-01	458	1.000E+01	499	7.974E+00	540	1.213E+01	581	1.636E+01
418	2.829E-01	459	9.573E+00	500	8.135E+00	541	1.223E+01	582	1.650E+01
419	3.145E-01	460	9.145E+00	501	8.278E+00	542	1.229E+01	583	1.661E+01
420	3.487E-01	461	8.725E+00	502	8.452E+00	543	1.237E+01	584	1.677E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	1.692E+01	626	1.986E+01	667	1.289E+01	708	4.990E+00	749	1.533E+00
586	1.710E+01	627	1.981E+01	668	1.265E+01	709	4.861E+00	750	1.487E+00
587	1.722E+01	628	1.972E+01	669	1.241E+01	710	4.732E+00	751	1.447E+00
588	1.737E+01	629	1.965E+01	670	1.220E+01	711	4.605E+00	752	1.398E+00
589	1.749E+01	630	1.955E+01	671	1.197E+01	712	4.472E+00	753	1.367E+00
590	1.765E+01	631	1.944E+01	672	1.173E+01	713	4.361E+00	754	1.327E+00
591	1.778E+01	632	1.937E+01	673	1.149E+01	714	4.250E+00	755	1.293E+00
592	1.791E+01	633	1.927E+01	674	1.128E+01	715	4.133E+00	756	1.249E+00
593	1.806E+01	634	1.911E+01	675	1.105E+01	716	4.028E+00	757	1.218E+00
594	1.817E+01	635	1.900E+01	676	1.084E+01	717	3.904E+00	758	1.184E+00
595	1.834E+01	636	1.889E+01	677	1.061E+01	718	3.793E+00	759	1.164E+00
596	1.845E+01	637	1.876E+01	678	1.038E+01	719	3.707E+00	760	1.127E+00
597	1.859E+01	638	1.861E+01	679	1.017E+01	720	3.608E+00	761	1.093E+00
598	1.875E+01	639	1.845E+01	680	9.953E+00	721	3.499E+00	762	1.065E+00
599	1.884E+01	640	1.831E+01	681	9.745E+00	722	3.395E+00	763	1.030E+00
600	1.898E+01	641	1.817E+01	682	9.520E+00	723	3.308E+00	764	1.014E+00
601	1.912E+01	642	1.805E+01	683	9.324E+00	724	3.203E+00	765	9.710E-01
602	1.920E+01	643	1.786E+01	684	9.120E+00	725	3.116E+00	766	9.509E-01
603	1.931E+01	644	1.769E+01	685	8.906E+00	726	3.032E+00	767	9.245E-01
604	1.938E+01	645	1.750E+01	686	8.712E+00	727	2.932E+00	768	8.939E-01
605	1.949E+01	646	1.735E+01	687	8.515E+00	728	2.846E+00	769	8.622E-01
606	1.959E+01	647	1.715E+01	688	8.306E+00	729	2.774E+00	770	8.473E-01
607	1.967E+01	648	1.697E+01	689	8.115E+00	730	2.681E+00	771	8.186E-01
608	1.977E+01	649	1.679E+01	690	7.938E+00	731	2.614E+00	772	7.989E-01
609	1.983E+01	650	1.658E+01	691	7.754E+00	732	2.535E+00	773	7.772E-01
610	1.992E+01	651	1.636E+01	692	7.548E+00	733	2.462E+00	774	7.520E-01
611	1.995E+01	652	1.620E+01	693	7.387E+00	734	2.377E+00	775	7.346E-01
612	1.999E+01	653	1.599E+01	694	7.218E+00	735	2.304E+00	776	7.043E-01
613	2.007E+01	654	1.578E+01	695	7.017E+00	736	2.253E+00	777	6.910E-01
614	2.009E+01	655	1.556E+01	696	6.861E+00	737	2.188E+00	778	6.747E-01
615	2.012E+01	656	1.533E+01	697	6.686E+00	738	2.116E+00	779	6.760E-01
616	2.013E+01	657	1.513E+01	698	6.489E+00	739	2.063E+00	780	6.773E-01
617	2.012E+01	658	1.493E+01	699	6.339E+00	740	2.002E+00		
618	2.015E+01	659	1.470E+01	700	6.176E+00	741	1.926E+00		
619	2.014E+01	660	1.448E+01	701	6.017E+00	742	1.875E+00		
620	2.012E+01	661	1.426E+01	702	5.857E+00	743	1.823E+00		
621	2.008E+01	662	1.402E+01	703	5.707E+00	744	1.775E+00		
622	2.007E+01	663	1.378E+01	704	5.554E+00	745	1.718E+00		
623	2.004E+01	664	1.355E+01	705	5.400E+00	746	1.665E+00		
624	1.999E+01	665	1.333E+01	706	5.255E+00	747	1.617E+00		
625	1.993E+01	666	1.309E+01	707	5.126E+00	748	1.565E+00		

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

Control Setting: 3000K

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

Test orientation: **Downward**

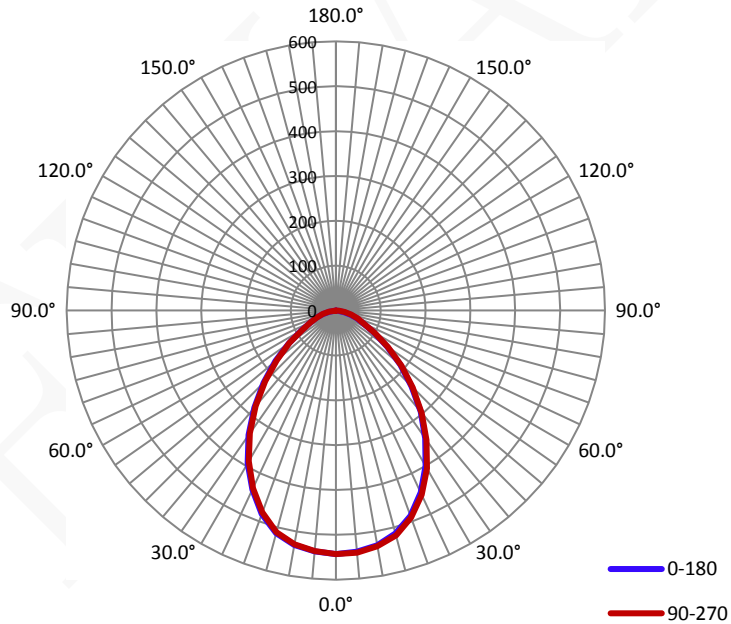
Electrical Measurement

Input Voltage(V)	Frequency(Hz)	Input Current(A)	Power (W)	Power Factor
120.0	60	0.1000	11.87	0.9930

Photometric Measurement

Luminous Flux(lm)	Efficacy(lm/W)	$I_{max}(cd)$	S/MH(C0/180)	S/MH(C90/270)
1024.7	86.38	542.8	1.11	1.11

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle(50% I_{max}):	83.1	82.9	83.0	83.1	83.0
Field Angle(10% I_{max}):	136.0	136.4	136.5	136.5	136.4

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	543	543	543	543	543	543	543	543
5.0°	540	541	541	541	542	540	540	540
10.0°	531	532	532	534	533	533	533	532
15.0°	514	518	517	519	519	519	518	516
20.0°	487	489	490	491	491	490	490	487
25.0°	447	450	451	453	453	451	450	448
30.0°	400	403	406	407	407	405	402	400
35.0°	348	350	353	355	353	352	349	345
40.0°	294	296	297	300	298	296	294	291
45.0°	239	242	243	245	243	242	239	236
50.0°	187	190	191	192	191	189	187	184
55.0°	140	141	143	143	143	141	139	137
60.0°	98	99	101	101	101	100	98	96
65.0°	67	69	69	70	70	69	68	66
70.0°	50	51	52	52	52	51	50	50
75.0°	34	35	35	36	36	35	34	34
80.0°	18	20	21	21	21	20	20	18
85.0°	4	5	6	7	7	7	5	3
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	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

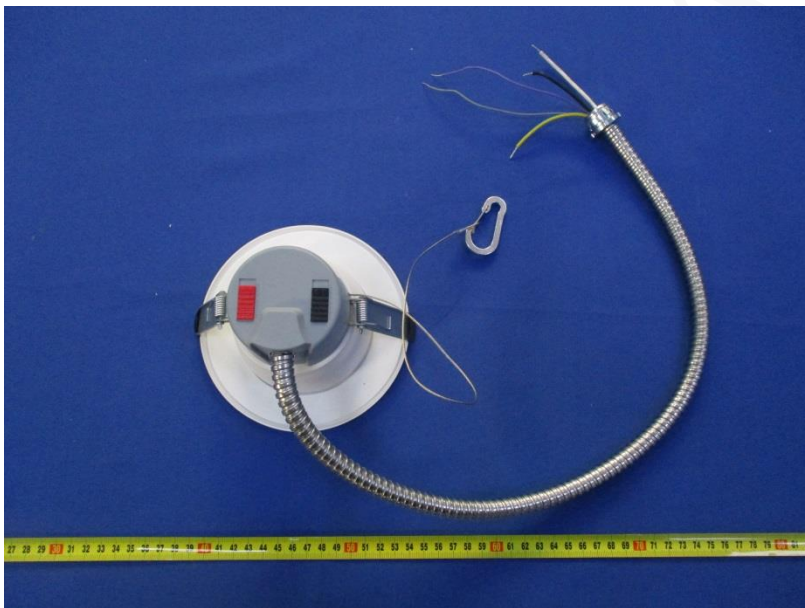
Luminous Intensity (cd) Distribution Data (cont.)

C γ	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	543	543	543	543	543	543	543	543
5.0°	539	540	539	538	538	539	538	539
10.0°	531	531	530	530	529	530	531	530
15.0°	514	513	511	512	511	510	512	512
20.0°	482	481	479	480	479	479	480	482
25.0°	440	439	436	437	437	438	441	442
30.0°	393	390	388	388	388	388	392	393
35.0°	339	336	334	333	334	336	338	341
40.0°	283	281	277	277	278	281	283	286
45.0°	228	225	222	223	223	225	228	232
50.0°	175	174	173	172	172	174	177	180
55.0°	129	127	126	126	126	128	130	133
60.0°	89	88	87	87	87	89	90	92
65.0°	62	61	61	61	62	62	63	64
70.0°	45	45	44	45	45	45	47	48
75.0°	29	29	30	30	30	31	31	32
80.0°	14	15	15	15	16	16	16	17
85.0°	0	0	1	2	2	3	3	2
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	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	12.9	1.26	0-5	12.9	1.26
5-10	38.3	3.74	0-10	51.2	5.00
10-15	62.1	6.06	0-15	113.3	11.06
15-20	82.4	8.04	0-20	195.7	19.10
20-25	97.5	9.51	0-25	293.1	28.61
25-30	106.5	10.39	0-30	399.6	39.00
30-35	109.0	10.64	0-35	508.7	49.64
35-40	105.4	10.28	0-40	614.0	59.92
40-45	96.6	9.42	0-45	710.6	69.35
45-50	83.9	8.19	0-50	794.5	77.53
50-55	68.8	6.71	0-55	863.2	84.24
55-60	52.8	5.15	0-60	916.0	89.40
60-65	38.7	3.78	0-65	954.7	93.17
65-70	28.7	2.80	0-70	983.5	95.98
70-75	21.1	2.06	0-75	1004.5	98.03
75-80	13.4	1.31	0-80	1018.0	99.34
80-85	5.8	0.56	0-85	1023.7	99.91
85-90	1.0	0.09	0-90	1024.7	100.00
90-95	0.0	0.00	0-95	1024.7	100.00
95-100	0.0	0.00	0-100	1024.7	100.00
100-105	0.0	0.00	0-105	1024.7	100.00
105-110	0.0	0.00	0-110	1024.7	100.00
110-115	0.0	0.00	0-115	1024.7	100.00
115-120	0.0	0.00	0-120	1024.7	100.00
120-125	0.0	0.00	0-125	1024.7	100.00
125-130	0.0	0.00	0-130	1024.7	100.00
130-135	0.0	0.00	0-135	1024.7	100.00
135-140	0.0	0.00	0-140	1024.7	100.00
140-145	0.0	0.00	0-145	1024.7	100.00
145-150	0.0	0.00	0-150	1024.7	100.00
150-155	0.0	0.00	0-155	1024.7	100.00
155-160	0.0	0.00	0-160	1024.7	100.00
160-165	0.0	0.00	0-165	1024.7	100.00
165-170	0.0	0.00	0-170	1024.7	100.00
170-175	0.0	0.00	0-175	1024.7	100.00
175-180	0.0	0.00	0-180	1024.7	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*****