



# ANSI/IES LM-79-19

## MEASUREMENT AND TEST REPORT

For

### Shenzhen UI led lighting Photoelectricity CO.,ltd

1401-1402,Building A,Yonghuayuan,No.6 Baotian 2nd Road,Chentian Community,Xixiang Street,Baoan District,Shenzhen,Guangdong, China

**Test Model: UL-PL30120-22W-TC**

<b>Report Type:</b>	Electrical and Photometric tests including: Luminous Flux, Power Factor, Chromaticity, Luminous Intensity Distribution
<b>Reviewed By:</b>	Ezer Pan <i>Ezer Pan</i>
<b>Report Number:</b>	DG5240229-10008E-EE
<b>Test Date:</b>	2024-04-02
<b>Report Date:</b>	2024-04-23
<b>Approved by:</b>	Blake Zhang / EE Engineer
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Dongguan). No.12, Pulong East 1 <sup>st</sup> Road, Tangxia Town, Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588

## 1. Product Description<sup>#</sup>

### General Information:

One test sample was in good condition and received on 2024-02-29, and used for testing.

Model Tested: UL-PL30120-22W-TC  
Manufacturer: Shenzhen UI led lighting Photoelectricity CO.,Ltd  
Brand Name: ULA1L  
Product Designation: LED Panel Light  
Burning Time Before Test: 0hour(For New Products)

### Rated Values:

Rated Voltage/Frequency: 220-240V AC 50/60Hz  
Rated Power: 22W  
Nominal CCT: 4000/5000K  
Nominal Lumen Output: 3300lm

## 2. Standards Used

- ANSI/IES LM-79-19: Approved method :Optical and Electrical Measurements of Solid-State Lighting Products
- ANSI C82.77-10-2020: Harmonic Emission Limits-Related Power Quality Requirements for Lighting
- 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
1.5m temperature integrating sphere	SENSING	SPR-600	S09008	2023-09-02	2024-09-01
High-precision rapid spectral analysis system	EVERFINE	HAAS-2000	M112048CA1361125	2023-09-02	2024-09-01
Digital power meter	YOKOGAWA	WT310	13398	2023-10-13	2024-10-12
Programmable Precision DC Power Supply	EVERFINE	WY5015	11060010	2023-09-02	2024-09-01
thermometer	SENSING	N/A	N/A	2023-10-13	2024-10-12
Standard Light Source	EVERFINE	D204	N/A	2023-05-12	2025-05-11
Precision frequency power supply	ALL Power	APW-105N	970613	2023-09-02	2024-09-01
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	2023-09-02	2024-09-01
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	2023-09-02	2024-09-01
Digital power meter	YOKOGAWA	WT-210	91j926132	2023-09-02	2024-09-01
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	2023-09-02	2024-09-01
wireless remote thermohygrometer	N/A	AOK-5017B	N/A	2023-09-02	2024-09-01

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Standard Light Source	EVERFINE	D908	N/A	2023-05-12	2025-05-11

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) 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 ANSI/IES LM-79-19. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at  $25^{\circ}\text{C} \pm 1.2^{\circ}\text{C}$  during measurement. And relative humidity is maintained between 10% and 65%. The air flow around the SSL product is less than 0.2m/s.

### 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  $U=2.1\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=32\text{K}$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the CRI is  $U=2.1$  ( $K=2$ ), at the 95% confidence level.

The uncertainty of power meter AC current  $U=0.19\%$  of rdg, AC Voltage  $U=0.15\%$  of rdg, Power  $U=0.20\%$  ( $K=2$ ), 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. For luminous intensity distribution, The vertical angle ( $\gamma$ ) test intervals were set no more than 2.5 degree, The horizontal angle (C plane) test intervals were set no more than 22.5 degree. For color spatial uniformity, the vertical angle ( $\gamma$ ) test intervals were set no more than 10 degree, the horizontal angle (C plane) test intervals were set no more than 90 degree.

The uncertainty of the luminous intensity is  $U=2.82\%$  ( $K=2$ ), 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**

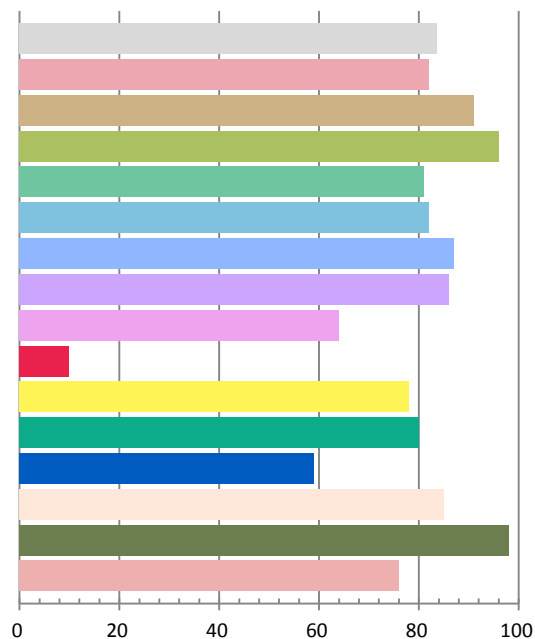
### Photometric and Electrical Measurement Result

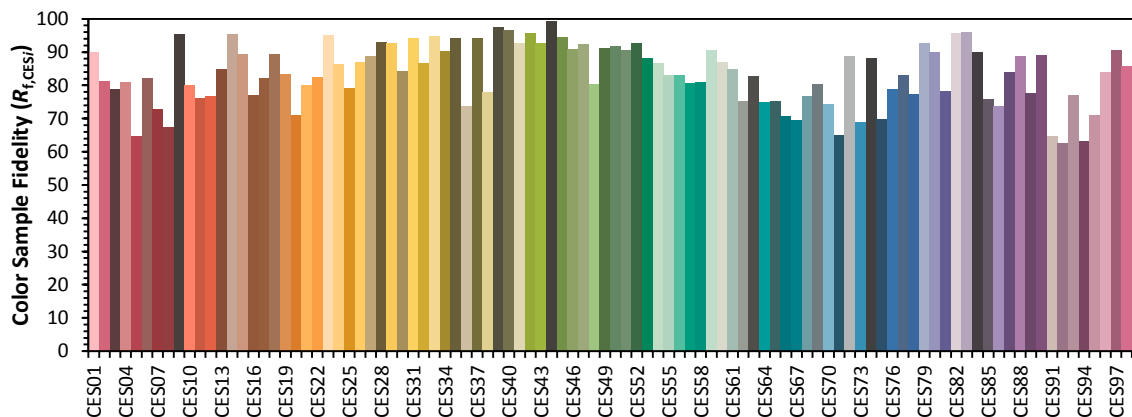
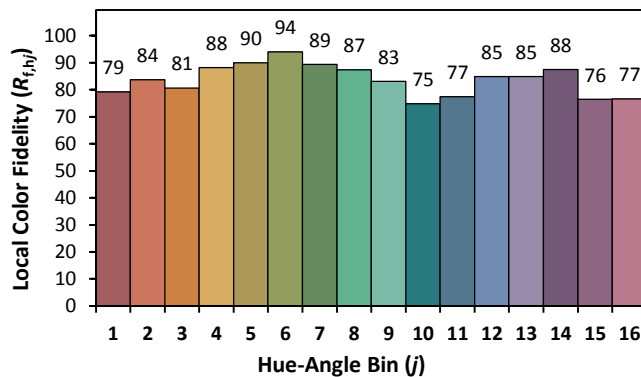
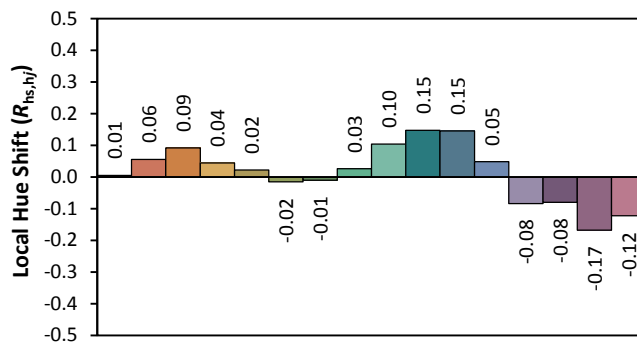
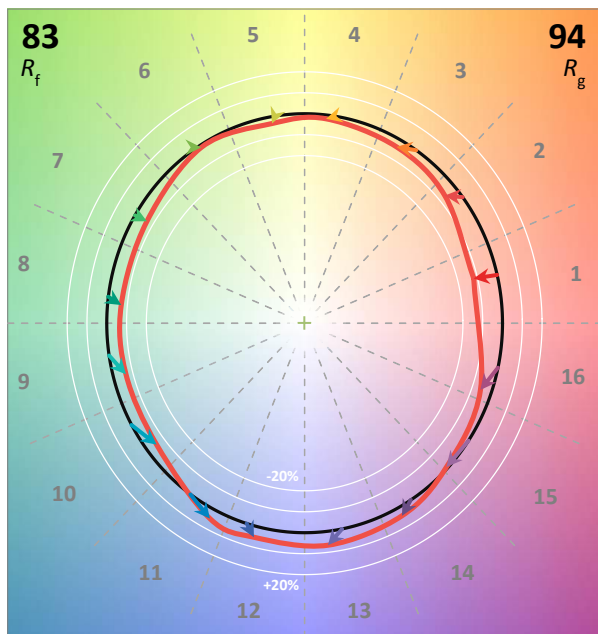
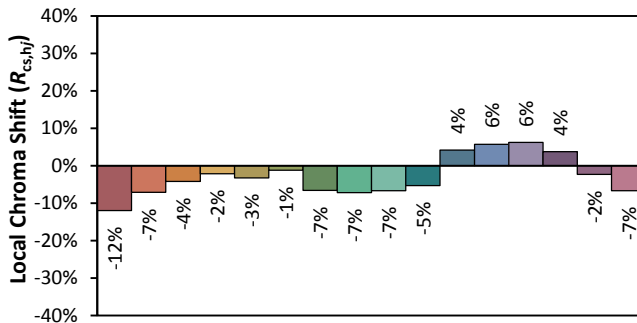
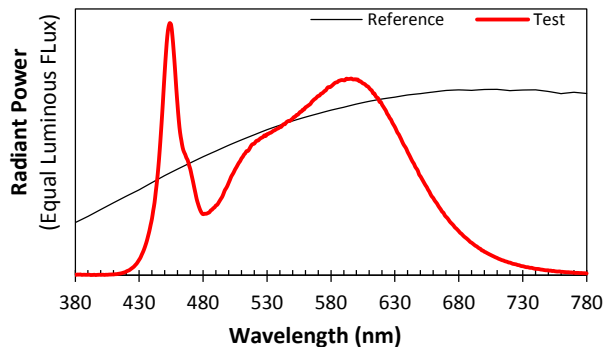
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
230.1	50	0.0975	21.75	0.9696	3346.5	153.85

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.093	4041	0.00121	0.3795	0.3787	0.2237	0.5023

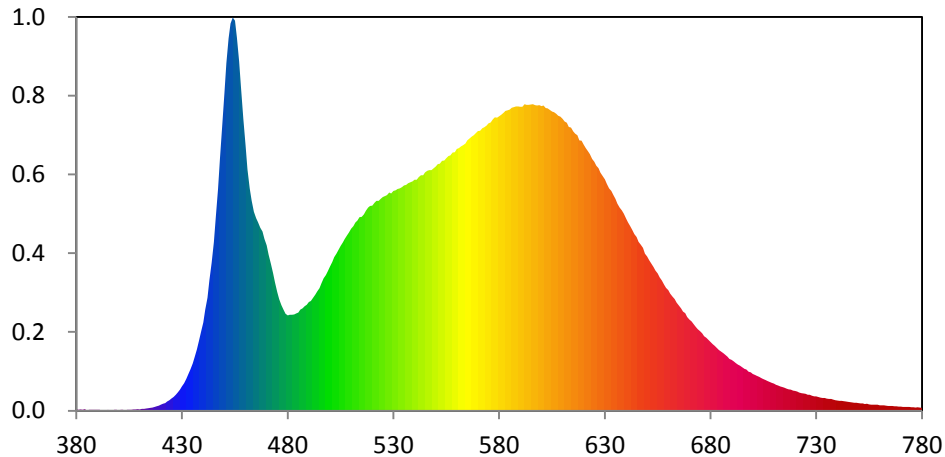
### Color Rendering Index

<b>Ra</b>			
<b>83.6</b>			
<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>
82	91	96	81
<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>
82	87	86	64
<b>R9</b>	<b>R10</b>	<b>R11</b>	<b>R12</b>
10	78	80	59
<b>R13</b>	<b>R14</b>	<b>R15</b>	
85	98	76	





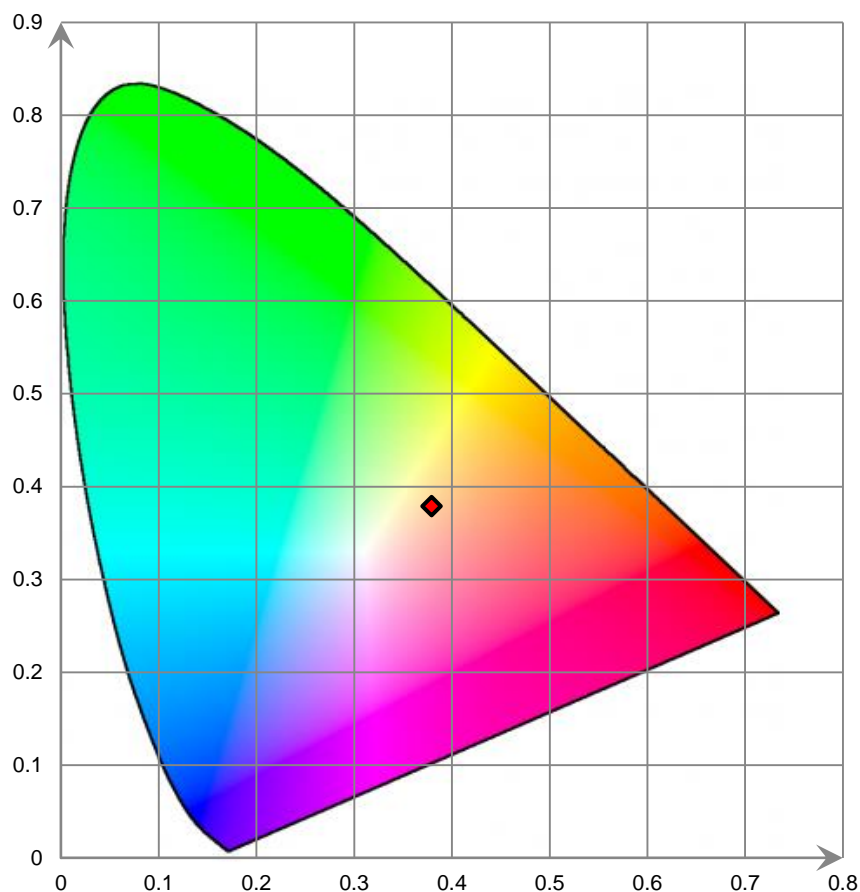
Relative Spectral Power Distribution



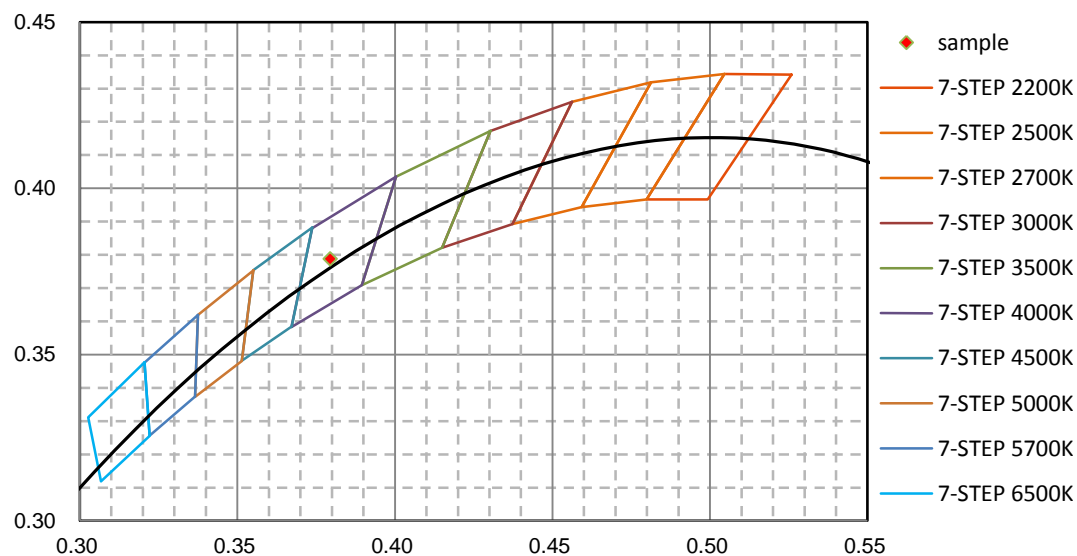
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.852E-01	421	1.310E+00	462	4.200E+01	503	2.966E+01	544	4.447E+01
381	1.363E-01	422	1.446E+00	463	3.970E+01	504	3.033E+01	545	4.500E+01
382	2.220E-01	423	1.707E+00	464	3.760E+01	505	3.113E+01	546	4.528E+01
383	1.745E-01	424	1.994E+00	465	3.637E+01	506	3.175E+01	547	4.545E+01
384	2.430E-01	425	2.270E+00	466	3.557E+01	507	3.244E+01	548	4.545E+01
385	1.175E-01	426	2.578E+00	467	3.453E+01	508	3.311E+01	549	4.582E+01
386	1.453E-01	427	3.012E+00	468	3.384E+01	509	3.363E+01	550	4.611E+01
387	1.598E-01	428	3.413E+00	469	3.242E+01	510	3.438E+01	551	4.657E+01
388	1.367E-01	429	3.979E+00	470	3.124E+01	511	3.486E+01	552	4.665E+01
389	1.372E-01	430	4.570E+00	471	2.949E+01	512	3.552E+01	553	4.716E+01
390	1.460E-01	431	5.192E+00	472	2.781E+01	513	3.593E+01	554	4.726E+01
391	1.637E-01	432	6.044E+00	473	2.596E+01	514	3.654E+01	555	4.766E+01
392	7.267E-02	433	6.857E+00	474	2.419E+01	515	3.659E+01	556	4.811E+01
393	8.827E-02	434	7.806E+00	475	2.241E+01	516	3.706E+01	557	4.820E+01
394	1.028E-01	435	8.904E+00	476	2.110E+01	517	3.775E+01	558	4.875E+01
395	1.483E-01	436	1.012E+01	477	1.993E+01	518	3.835E+01	559	4.881E+01
396	5.735E-02	437	1.157E+01	478	1.898E+01	519	3.864E+01	560	4.939E+01
397	1.170E-01	438	1.307E+01	479	1.831E+01	520	3.874E+01	561	4.962E+01
398	1.308E-01	439	1.487E+01	480	1.797E+01	521	3.925E+01	562	4.990E+01
399	1.658E-01	440	1.663E+01	481	1.811E+01	522	3.962E+01	563	5.017E+01
400	1.191E-01	441	1.907E+01	482	1.810E+01	523	3.965E+01	564	5.047E+01
401	1.492E-01	442	2.134E+01	483	1.818E+01	524	4.002E+01	565	5.104E+01
402	1.502E-01	443	2.463E+01	484	1.837E+01	525	4.033E+01	566	5.143E+01
403	1.011E-01	444	2.789E+01	485	1.856E+01	526	4.053E+01	567	5.180E+01
404	1.580E-01	445	3.182E+01	486	1.909E+01	527	4.074E+01	568	5.204E+01
405	1.440E-01	446	3.652E+01	487	1.931E+01	528	4.120E+01	569	5.244E+01
406	1.818E-01	447	4.188E+01	488	1.975E+01	529	4.100E+01	570	5.278E+01
407	2.203E-01	448	4.760E+01	489	2.000E+01	530	4.152E+01	571	5.287E+01
408	2.176E-01	449	5.378E+01	490	2.053E+01	531	4.162E+01	572	5.336E+01
409	2.515E-01	450	6.000E+01	491	2.074E+01	532	4.186E+01	573	5.355E+01
410	2.323E-01	451	6.561E+01	492	2.130E+01	533	4.198E+01	574	5.384E+01
411	3.121E-01	452	7.034E+01	493	2.193E+01	534	4.225E+01	575	5.424E+01
412	3.155E-01	453	7.312E+01	494	2.254E+01	535	4.253E+01	576	5.443E+01
413	3.824E-01	454	7.425E+01	495	2.315E+01	536	4.268E+01	577	5.505E+01
414	4.418E-01	455	7.367E+01	496	2.405E+01	537	4.294E+01	578	5.540E+01
415	5.057E-01	456	7.048E+01	497	2.503E+01	538	4.315E+01	579	5.535E+01
416	5.775E-01	457	6.594E+01	498	2.562E+01	539	4.330E+01	580	5.557E+01
417	6.793E-01	458	6.087E+01	499	2.633E+01	540	4.360E+01	581	5.590E+01
418	8.060E-01	459	5.518E+01	500	2.722E+01	541	4.365E+01	582	5.625E+01
419	9.126E-01	460	5.014E+01	501	2.808E+01	542	4.412E+01	583	5.659E+01
420	1.125E+00	461	4.555E+01	502	2.902E+01	543	4.447E+01	584	5.677E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	5.684E+01	626	4.628E+01	667	1.870E+01	708	5.413E+00	749	1.462E+00
586	5.720E+01	627	4.580E+01	668	1.840E+01	709	5.240E+00	750	1.447E+00
587	5.731E+01	628	4.494E+01	669	1.767E+01	710	5.089E+00	751	1.344E+00
588	5.745E+01	629	4.430E+01	670	1.722E+01	711	4.877E+00	752	1.387E+00
589	5.746E+01	630	4.366E+01	671	1.685E+01	712	4.737E+00	753	1.239E+00
590	5.740E+01	631	4.286E+01	672	1.635E+01	713	4.577E+00	754	1.298E+00
591	5.742E+01	632	4.201E+01	673	1.580E+01	714	4.426E+00	755	1.196E+00
592	5.787E+01	633	4.150E+01	674	1.539E+01	715	4.331E+00	756	1.143E+00
593	5.778E+01	634	4.075E+01	675	1.502E+01	716	4.149E+00	757	1.100E+00
594	5.778E+01	635	3.997E+01	676	1.460E+01	717	4.046E+00	758	1.114E+00
595	5.783E+01	636	3.911E+01	677	1.408E+01	718	3.940E+00	759	1.116E+00
596	5.792E+01	637	3.838E+01	678	1.377E+01	719	3.756E+00	760	1.022E+00
597	5.768E+01	638	3.783E+01	679	1.338E+01	720	3.724E+00	761	1.017E+00
598	5.765E+01	639	3.720E+01	680	1.298E+01	721	3.579E+00	762	9.724E-01
599	5.771E+01	640	3.629E+01	681	1.252E+01	722	3.407E+00	763	9.380E-01
600	5.755E+01	641	3.558E+01	682	1.224E+01	723	3.328E+00	764	9.079E-01
601	5.763E+01	642	3.484E+01	683	1.185E+01	724	3.257E+00	765	8.922E-01
602	5.714E+01	643	3.405E+01	684	1.146E+01	725	3.187E+00	766	8.956E-01
603	5.711E+01	644	3.335E+01	685	1.115E+01	726	3.017E+00	767	8.313E-01
604	5.682E+01	645	3.278E+01	686	1.086E+01	727	2.979E+00	768	8.303E-01
605	5.650E+01	646	3.190E+01	687	1.053E+01	728	2.837E+00	769	7.647E-01
606	5.636E+01	647	3.137E+01	688	1.018E+01	729	2.702E+00	770	7.472E-01
607	5.608E+01	648	3.073E+01	689	9.791E+00	730	2.671E+00	771	6.959E-01
608	5.570E+01	649	2.965E+01	690	9.585E+00	731	2.579E+00	772	7.015E-01
609	5.555E+01	650	2.913E+01	691	9.290E+00	732	2.456E+00	773	6.973E-01
610	5.509E+01	651	2.847E+01	692	8.989E+00	733	2.385E+00	774	6.741E-01
611	5.465E+01	652	2.780E+01	693	8.691E+00	734	2.373E+00	775	6.499E-01
612	5.437E+01	653	2.713E+01	694	8.505E+00	735	2.257E+00	776	6.651E-01
613	5.357E+01	654	2.648E+01	695	8.194E+00	736	2.187E+00	777	6.049E-01
614	5.348E+01	655	2.592E+01	696	7.924E+00	737	2.192E+00	778	6.138E-01
615	5.272E+01	656	2.518E+01	697	7.742E+00	738	2.073E+00	779	5.848E-01
616	5.233E+01	657	2.459E+01	698	7.323E+00	739	1.961E+00	780	5.446E-01
617	5.202E+01	658	2.380E+01	699	7.245E+00	740	1.897E+00		
618	5.106E+01	659	2.317E+01	700	6.929E+00	741	1.874E+00		
619	5.100E+01	660	2.275E+01	701	6.769E+00	742	1.857E+00		
620	5.019E+01	661	2.209E+01	702	6.549E+00	743	1.806E+00		
621	4.963E+01	662	2.158E+01	703	6.352E+00	744	1.699E+00		
622	4.902E+01	663	2.109E+01	704	6.153E+00	745	1.661E+00		
623	4.843E+01	664	2.042E+01	705	5.972E+00	746	1.601E+00		
624	4.755E+01	665	1.986E+01	706	5.775E+00	747	1.523E+00		
625	4.701E+01	666	1.933E+01	707	5.605E+00	748	1.468E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles





### [Goniophotometer System]

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

Test orientation: **Downward**

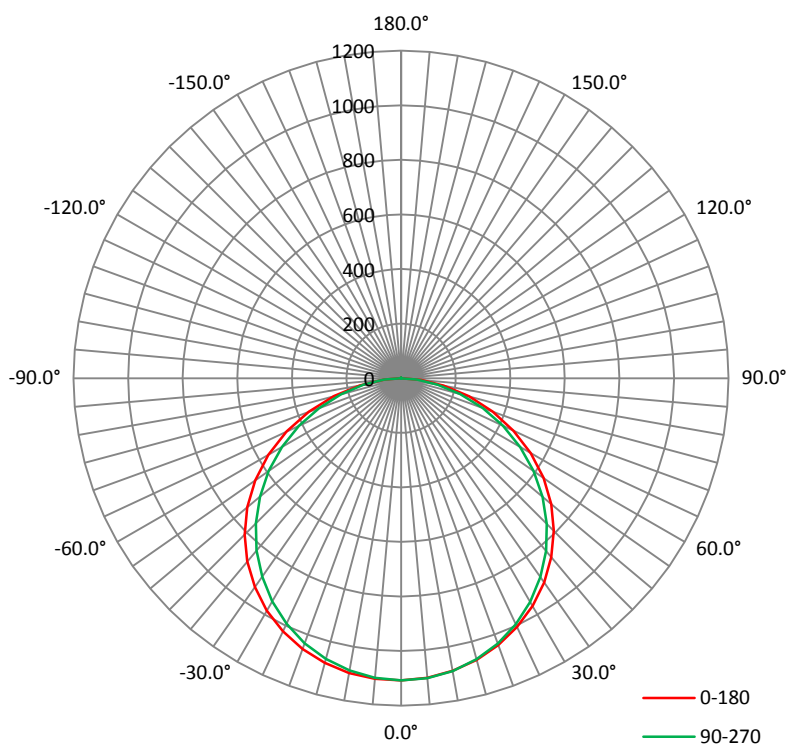
### Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
230.06	50	0.0974	21.730	0.9697

### Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	$I_{max}$ (cd)	S/MH (C0/180)	S/MH (C90/270)
3348.83	154.11	1108	1.30	1.27

### Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% $I_{max}$ ):	120.1	117.2	114.4	117.2	117.2
Field Angle (10% $I_{max}$ ):	164.9	164.2	163.4	164.2	164.2

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0°	1107	1107	1107	1107	1107	1107	1107	1107
1°	1108	1108	1107	1107	1107	1107	1107	1107
2°	1108	1108	1107	1107	1106	1106	1106	1106
3°	1107	1107	1107	1106	1105	1105	1105	1104
4°	1107	1106	1106	1105	1104	1104	1103	1103
5°	1106	1106	1105	1104	1102	1102	1101	1101
6°	1105	1104	1103	1102	1100	1099	1099	1099
7°	1103	1102	1101	1100	1098	1097	1096	1097
8°	1101	1101	1099	1097	1095	1094	1094	1094
9°	1099	1099	1097	1094	1091	1091	1090	1091
10°	1097	1096	1094	1091	1088	1087	1087	1087
11°	1094	1093	1090	1087	1084	1083	1083	1084
12°	1091	1090	1087	1083	1080	1079	1079	1080
13°	1088	1086	1083	1079	1075	1074	1074	1075
14°	1084	1083	1079	1074	1070	1069	1069	1071
15°	1080	1079	1074	1069	1065	1064	1064	1066
16°	1076	1074	1069	1064	1059	1058	1059	1060
17°	1071	1069	1064	1058	1053	1052	1053	1055
18°	1066	1064	1059	1052	1047	1046	1047	1049
19°	1061	1059	1053	1046	1040	1039	1041	1043
20°	1056	1053	1047	1039	1033	1032	1034	1037
21°	1050	1047	1040	1032	1026	1024	1027	1030
22°	1044	1041	1033	1025	1018	1017	1020	1023
23°	1037	1034	1026	1016	1010	1009	1012	1016
24°	1030	1027	1018	1008	1001	1000	1004	1008
25°	1024	1020	1011	1000	993	992	996	1000
26°	1016	1012	1002	991	984	983	987	992
27°	1009	1005	994	982	974	973	978	984
28°	1000	996	985	972	964	964	969	975
29°	992	987	976	963	954	954	959	966
30°	983	979	966	953	944	943	949	956
31°	974	969	956	942	933	933	939	947
32°	965	960	947	932	923	922	929	937
33°	955	950	936	920	911	911	918	926
34°	945	939	925	909	899	899	907	916
35°	934	929	914	898	887	888	895	905
36°	923	918	902	886	875	875	883	894
37°	913	906	891	873	863	863	872	882
38°	901	895	878	861	850	850	859	870
39°	889	883	866	848	837	837	847	858
40°	877	870	853	834	824	824	834	845
41°	865	858	840	821	810	811	821	833
42°	852	844	827	807	796	797	807	819
43°	838	831	813	793	782	783	793	806
44°	825	818	799	779	767	769	779	792
45°	811	804	785	764	752	754	765	778
46°	797	789	770	749	738	739	750	764
47°	782	774	755	734	722	724	736	749
48°	767	760	740	719	707	709	720	735
49°	752	744	724	703	691	693	705	719

Luminous Intensity (cd) Distribution Data

$\begin{matrix} C \\ \backslash \\ y \end{matrix}$	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
50°	736	728	708	687	675	677	689	704
51°	720	712	692	671	659	661	673	688
52°	704	696	675	654	642	644	657	672
53°	687	679	659	638	626	628	640	655
54°	670	662	642	621	609	611	624	639
55°	653	645	625	604	592	594	607	622
56°	635	627	607	586	575	577	590	605
57°	617	609	589	568	557	559	572	587
58°	598	591	571	551	540	542	555	570
59°	580	573	553	533	522	524	537	552
60°	561	554	534	515	504	506	519	534
61°	542	535	516	496	486	488	501	515
62°	522	515	496	477	467	470	482	496
63°	502	496	477	459	449	452	463	478
64°	482	476	458	440	431	433	445	459
65°	462	456	439	421	412	415	426	440
66°	442	436	419	402	394	396	407	420
67°	421	416	400	383	375	377	388	401
68°	401	395	380	365	356	359	369	381
69°	380	375	360	345	337	340	350	362
70°	359	354	340	326	319	321	331	342
71°	338	334	321	307	300	303	312	322
72°	316	313	301	288	282	284	293	303
73°	295	292	281	270	264	266	274	283
74°	274	272	262	251	245	247	255	264
75°	253	251	242	232	227	229	236	244
76°	232	231	223	214	209	211	218	225
77°	212	211	204	196	192	193	199	205
78°	191	191	185	178	175	176	182	187
79°	171	171	167	160	157	159	164	168
80°	152	152	148	143	141	142	146	150
81°	132	133	130	127	124	126	129	132
82°	114	115	113	110	108	110	112	115
83°	96	97	96	94	93	94	96	97
84°	78	80	80	78	78	78	80	81
85°	61	64	65	64	64	64	66	66
86°	45	48	49	49	49	50	51	51
87°	30	32	34	36	36	36	36	36
88°	15	18	20	23	23	24	23	22
89°	10	12	6	6	7	9	11	9
90°	5	6	3	3	4	5	7	5
91°	0	0	0	0	0	0	4	0
92°	0	0	0	0	0	0	0	0
93°	0	0	0	0	0	0	0	0
94°	0	0	0	0	0	0	0	0
95°	0	0	0	0	0	0	0	0
96°	0	0	0	0	0	0	0	0
97°	0	0	0	0	0	0	0	0
98°	0	0	0	0	0	0	0	0
99°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
100°	0	0	0	0	0	0	0	0
101°	0	0	0	0	0	0	0	0
102°	0	0	0	0	0	0	0	0
103°	0	0	0	0	0	0	0	0
104°	0	0	0	0	0	0	0	0
105°	0	0	0	0	0	0	0	0
106°	0	0	0	0	0	0	0	0
107°	0	0	0	0	0	0	0	0
108°	0	0	0	0	0	0	0	0
109°	0	0	0	0	0	0	0	0
110°	0	0	0	0	0	0	0	0
111°	0	0	0	0	0	0	0	0
112°	0	0	0	0	0	0	0	0
113°	0	0	0	0	0	0	0	0
114°	0	0	0	0	0	0	0	0
115°	0	0	0	0	0	0	0	0
116°	0	0	0	0	0	0	0	0
117°	0	0	0	0	0	0	0	0
118°	0	0	0	0	0	0	0	0
119°	0	0	0	0	0	0	0	0
120°	0	0	0	0	0	0	0	0
121°	0	0	0	0	0	0	0	0
122°	0	0	0	0	0	0	0	0
123°	0	1	1	1	1	1	1	0
124°	1	1	1	1	1	1	1	1
125°	1	1	1	1	1	1	1	1
126°	1	1	1	1	1	1	1	1
127°	1	1	1	1	1	1	1	1
128°	1	1	1	1	1	1	1	1
129°	1	1	1	1	1	1	1	1
130°	1	1	1	1	1	1	1	1
131°	1	1	1	1	1	1	1	1
132°	1	1	1	1	1	1	1	1
133°	1	1	1	1	1	1	1	1
134°	1	1	1	1	1	1	1	1
135°	1	1	1	1	1	1	1	1
136°	1	1	1	1	1	1	1	1
137°	1	1	1	1	1	1	1	1
138°	1	1	1	1	1	1	1	1
139°	1	1	1	1	1	1	1	1
140°	1	1	1	1	1	1	1	1
141°	1	1	1	1	1	1	1	1
142°	1	1	1	1	1	1	1	1
143°	1	1	1	1	1	1	1	1
144°	1	1	1	1	1	1	1	1
145°	1	1	1	1	1	1	1	1
146°	1	1	1	1	1	1	1	1
147°	1	1	1	1	1	1	1	1
148°	1	1	1	1	1	1	1	1
149°	1	1	1	1	2	1	1	1

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
150°	1	1	1	2	2	1	1	1
151°	1	1	1	2	2	2	1	1
152°	1	1	2	2	2	2	1	1
153°	1	1	2	2	2	2	1	1
154°	1	2	2	2	2	2	2	1
155°	1	2	2	2	2	2	2	1
156°	1	2	2	2	2	2	2	1
157°	1	2	2	2	2	2	2	1
158°	1	2	2	2	2	2	2	1
159°	1	2	2	2	2	2	2	1
160°	2	2	2	2	2	2	2	1
161°	2	2	2	2	2	2	2	1
162°	2	2	2	2	2	2	2	1
163°	2	2	2	2	2	2	2	1
164°	2	2	2	2	2	2	2	1
165°	2	2	2	2	2	2	2	1
166°	2	2	2	2	2	2	2	1
167°	2	2	2	2	2	2	2	1
168°	2	2	2	2	2	2	2	1
169°	1	2	2	2	2	2	1	1
170°	1	2	2	2	2	2	1	1
171°	1	2	2	2	1	1	1	1
172°	2	2	2	2	1	1	1	1
173°	2	1	2	1	1	1	1	1
174°	1	1	1	1	1	1	1	1
175°	1	1	1	1	1	1	1	1
176°	1	1	1	1	1	1	1	1
177°	1	1	1	1	1	1	1	1
178°	1	1	1	1	1	1	1	1
179°	1	1	1	1	1	1	1	1
180°	1	1	1	1	1	1	1	1

Luminous Intensity (cd) Distribution Data (cont.)

C Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0°	1107	1107	1107	1107	1107	1107	1107	1107
1°	1107	1107	1107	1107	1107	1108	1107	1108
2°	1106	1106	1106	1106	1107	1107	1107	1108
3°	1105	1105	1105	1105	1106	1107	1107	1107
4°	1104	1103	1104	1104	1105	1105	1106	1107
5°	1102	1102	1102	1102	1103	1104	1105	1106
6°	1100	1100	1100	1100	1101	1102	1104	1105
7°	1098	1097	1097	1098	1099	1101	1102	1103
8°	1095	1095	1095	1095	1096	1098	1100	1101
9°	1092	1092	1091	1092	1093	1095	1097	1099
10°	1089	1088	1088	1088	1089	1092	1095	1097
11°	1085	1085	1084	1084	1086	1088	1092	1094
12°	1081	1081	1080	1080	1082	1085	1088	1091
13°	1078	1077	1076	1076	1077	1080	1084	1088
14°	1073	1072	1071	1071	1072	1076	1080	1084
15°	1069	1068	1066	1065	1067	1071	1076	1080
16°	1064	1063	1061	1060	1061	1065	1071	1076
17°	1058	1057	1055	1054	1055	1060	1066	1071
18°	1053	1052	1049	1047	1049	1054	1060	1066
19°	1047	1046	1043	1041	1042	1047	1055	1061
20°	1041	1039	1036	1034	1035	1041	1049	1055
21°	1035	1033	1029	1027	1028	1034	1042	1050
22°	1028	1026	1022	1019	1020	1026	1035	1043
23°	1021	1019	1014	1011	1012	1019	1028	1037
24°	1014	1011	1006	1003	1004	1011	1021	1030
25°	1006	1004	998	994	995	1002	1013	1023
26°	998	995	990	985	986	993	1005	1015
27°	990	987	981	976	977	984	996	1008
28°	982	979	972	966	967	975	988	999
29°	973	970	962	956	957	965	979	991
30°	964	960	952	946	947	955	969	982
31°	954	951	942	936	936	945	959	973
32°	945	941	932	925	925	934	949	963
33°	935	930	921	913	914	923	939	953
34°	924	920	910	902	902	912	928	943
35°	914	909	899	890	890	900	917	933
36°	903	898	887	878	878	888	906	922
37°	892	886	875	866	865	876	894	911
38°	880	875	863	853	853	863	882	899
39°	868	863	851	840	840	850	869	887
40°	856	850	838	827	826	837	856	875
41°	844	837	825	813	812	823	843	862
42°	831	825	811	800	798	810	830	849
43°	818	811	797	785	784	796	816	836
44°	805	798	783	771	770	781	802	823
45°	791	784	769	756	755	767	788	809
46°	777	770	754	741	740	752	773	795
47°	762	755	740	726	725	737	758	780
48°	748	740	725	711	709	721	743	765
49°	733	725	709	695	693	705	727	750

Luminous Intensity (cd) Distribution Data (cont.)

$\begin{matrix} C \\ \backslash \\ y \end{matrix}$	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
50°	718	710	693	679	677	689	712	734
51°	702	694	677	663	661	673	695	718
52°	686	678	661	647	644	656	679	702
53°	670	662	645	630	627	639	662	685
54°	654	645	628	613	610	622	645	668
55°	637	628	611	596	593	605	628	651
56°	620	611	594	579	576	587	610	634
57°	603	594	576	561	558	570	592	616
58°	585	576	559	543	540	552	574	597
59°	567	559	541	525	522	533	556	579
60°	549	540	523	507	504	515	537	560
61°	531	522	504	489	486	497	518	541
62°	512	503	486	471	467	478	499	522
63°	493	485	467	452	449	459	480	502
64°	474	465	448	434	430	440	461	483
65°	455	447	429	415	411	421	441	463
66°	436	427	410	396	393	402	422	443
67°	416	408	391	377	373	383	402	422
68°	396	388	372	358	355	363	382	402
69°	377	369	353	340	336	344	362	382
70°	357	349	334	320	317	325	342	361
71°	337	329	314	302	298	306	322	340
72°	317	309	295	283	280	287	302	319
73°	297	290	276	264	261	268	283	299
74°	277	270	257	246	243	249	263	278
75°	257	250	238	227	224	230	243	257
76°	237	231	220	210	207	212	224	237
77°	218	212	201	192	189	193	205	216
78°	198	193	183	174	171	175	186	196
79°	179	173	164	155	153	157	167	176
80°	159	154	146	139	136	139	147	156
81°	141	136	129	122	120	123	130	138
82°	123	119	112	106	104	106	112	119
83°	106	102	96	90	88	90	95	102
84°	89	85	80	75	73	75	79	84
85°	73	69	65	61	59	60	63	68
86°	57	54	50	47	45	46	48	51
87°	42	39	36	33	32	32	34	36
88°	29	27	24	22	21	22	23	24
89°	16	14	13	11	11	11	11	12
90°	3	2	1	0	0	0	0	0
91°	0	0	0	0	0	0	0	0
92°	0	0	0	0	0	0	0	0
93°	0	0	0	0	0	0	0	0
94°	0	0	0	0	0	0	0	0
95°	0	0	0	0	0	0	0	0
96°	0	0	0	0	0	0	0	0
97°	0	0	0	0	0	0	0	0
98°	0	0	0	0	0	0	0	0
99°	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°
100°	0	0	0	0	0	0	0	0
101°	0	0	0	0	0	0	0	0
102°	0	0	0	0	0	0	0	0
103°	0	0	0	0	0	0	0	0
104°	0	0	0	0	0	0	0	0
105°	0	0	0	0	0	0	0	0
106°	0	0	0	0	0	0	0	0
107°	0	0	0	0	0	0	0	0
108°	0	0	0	0	0	0	0	0
109°	0	0	0	0	0	0	0	0
110°	0	0	0	0	0	0	0	0
111°	0	0	0	0	0	0	0	0
112°	0	0	0	0	0	0	0	0
113°	0	0	0	0	0	0	0	0
114°	0	0	0	0	0	0	0	0
115°	0	0	0	0	0	0	0	0
116°	0	0	0	0	0	0	0	0
117°	0	0	0	0	0	0	0	0
118°	0	0	0	0	0	0	0	0
119°	0	0	0	0	0	0	0	0
120°	0	0	0	0	0	0	0	0
121°	0	0	0	0	0	0	0	0
122°	0	0	0	0	0	0	0	0
123°	0	0	0	0	0	0	0	0
124°	0	0	0	0	0	0	0	0
125°	0	0	0	0	0	0	0	0
126°	0	0	0	0	0	0	0	0
127°	0	0	0	0	0	0	0	0
128°	0	0	0	0	0	0	0	0
129°	0	0	0	0	0	0	0	0
130°	0	0	0	0	0	0	0	0
131°	0	0	0	0	0	0	0	0
132°	0	0	0	0	0	0	0	0
133°	0	0	0	0	0	0	0	0
134°	0	0	0	0	0	0	0	0
135°	0	0	0	0	0	0	0	0
136°	0	0	0	1	0	0	0	0
137°	1	0	0	1	0	0	0	0
138°	1	1	1	1	1	0	0	1
139°	1	1	1	1	1	1	1	1
140°	1	1	1	1	1	1	1	1
141°	1	1	1	1	1	1	1	1
142°	1	1	1	1	1	1	1	1
143°	1	1	1	1	1	1	1	1
144°	1	1	1	1	1	1	1	1
145°	1	1	1	1	1	1	1	1
146°	1	1	1	1	1	1	1	1
147°	1	1	1	1	1	1	1	1
148°	1	1	1	1	1	1	1	1
149°	1	1	1	1	1	1	1	1



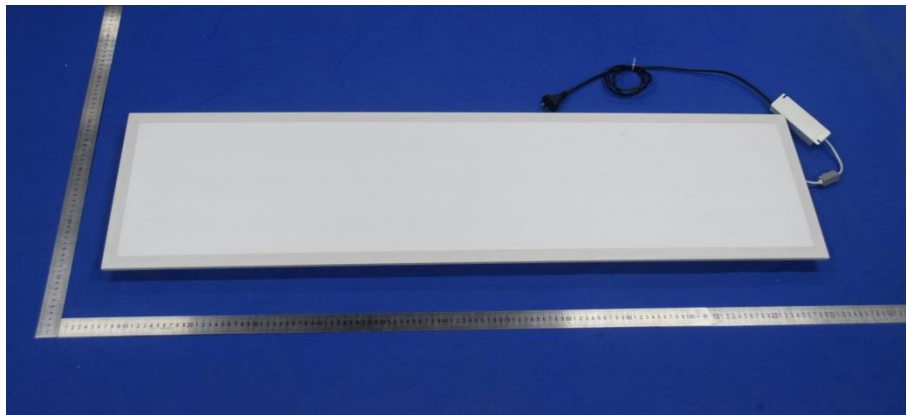
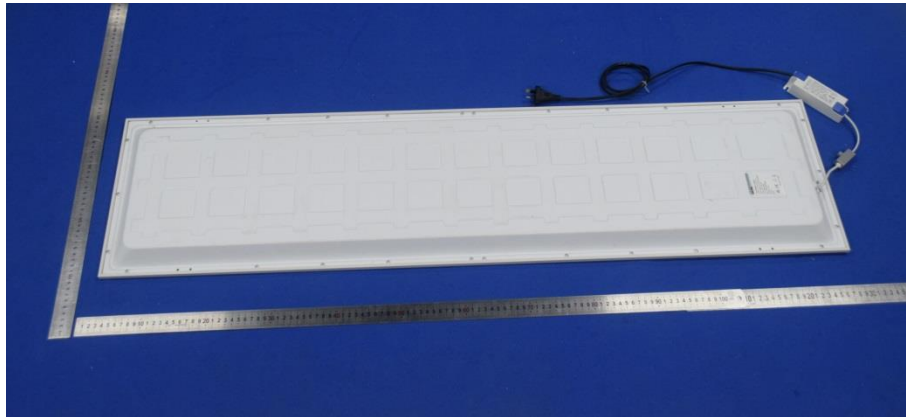
Luminous Intensity (cd) Distribution Data (cont.)

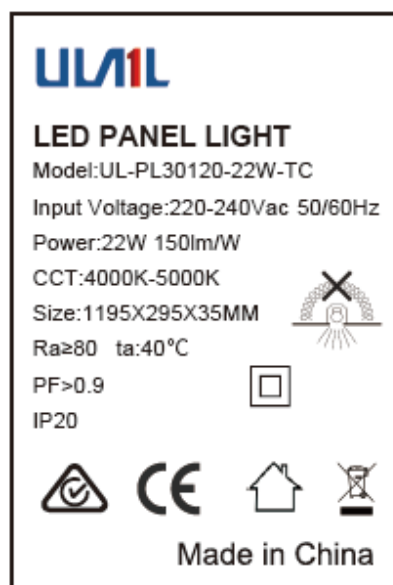
$\begin{matrix} C \\ \backslash \\ y \end{matrix}$	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
150°	1	1	1	1	1	1	1	1
151°	1	1	1	1	1	1	1	1
152°	1	1	1	1	1	1	1	1
153°	1	1	1	1	1	1	1	1
154°	1	1	1	1	1	1	1	1
155°	1	1	1	1	1	1	1	1
156°	1	1	1	1	1	1	1	1
157°	1	1	1	1	1	1	1	1
158°	1	1	1	1	1	1	1	1
159°	1	1	1	1	1	1	1	1
160°	1	1	1	1	1	1	1	1
161°	1	1	1	1	1	1	1	1
162°	1	1	1	1	1	1	1	1
163°	1	1	1	1	1	1	1	1
164°	1	1	1	1	1	1	1	1
165°	1	1	1	1	1	1	1	1
166°	1	1	1	1	1	1	1	1
167°	1	1	1	1	1	1	1	1
168°	1	1	1	1	1	1	1	1
169°	1	1	1	1	1	1	1	1
170°	1	1	1	1	1	1	1	1
171°	1	1	1	1	1	1	1	1
172°	1	1	1	1	1	1	1	1
173°	1	1	1	1	1	1	1	1
174°	1	1	1	1	1	1	1	1
175°	1	1	1	1	1	1	1	1
176°	1	1	1	1	1	1	1	1
177°	1	1	1	1	1	1	1	1
178°	1	1	1	1	1	1	1	1
179°	1	1	1	1	1	1	1	1
180°	1	1	1	1	1	1	1	1

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	26.4	0.79	0-5	26.4	0.79
5-10	78.5	2.34	0-10	104.9	3.13
10-15	128.2	3.83	0-15	233.1	6.96
15-20	174.0	5.20	0-20	407.1	12.16
20-25	214.6	6.40	0-25	621.7	18.56
25-30	248.5	7.42	0-30	870.2	25.98
30-35	274.7	8.21	0-35	1144.9	34.19
35-40	292.3	8.73	0-40	1437.2	42.92
40-45	300.4	8.97	0-45	1737.7	51.89
45-50	298.7	8.92	0-50	2036.4	60.81
50-55	286.9	8.56	0-55	2323.2	69.37
55-60	265.1	7.92	0-60	2588.4	77.29
60-65	234.2	7.00	0-65	2822.6	84.29
65-70	195.4	5.83	0-70	3017.9	90.12
70-75	150.8	4.50	0-75	3168.7	94.62
75-80	103.3	3.09	0-80	3272.0	97.71
80-85	56.8	1.69	0-85	3328.8	99.40
85-90	16.6	0.50	0-90	3345.4	99.90
90-95	0.3	0.01	0-95	3345.7	99.91
95-100	0.1	0.00	0-100	3345.8	99.91
100-105	0.1	0.00	0-105	3345.9	99.91
105-110	0.1	0.01	0-110	3346.0	99.92
110-115	0.2	0.00	0-115	3346.2	99.92
115-120	0.2	0.01	0-120	3346.4	99.93
120-125	0.2	0.00	0-125	3346.5	99.93
125-130	0.2	0.01	0-130	3346.8	99.94
130-135	0.2	0.01	0-135	3347.0	99.95
135-140	0.3	0.00	0-140	3347.3	99.95
140-145	0.3	0.01	0-145	3347.5	99.96
145-150	0.3	0.01	0-150	3347.8	99.97
150-155	0.3	0.01	0-155	3348.1	99.98
155-160	0.3	0.01	0-160	3348.4	99.99
160-165	0.2	0.00	0-165	3348.6	99.99
165-170	0.2	0.01	0-170	3348.7	100.00
170-175	0.1	0.00	0-175	3348.8	100.00
175-180	0.0	0.00	0-180	3348.8	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  $K=2$  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\*\*\*\*\*