



ANSI/IES LM-79-19

MEASUREMENT AND TEST REPORT

For

Shenzhen Ul 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-PL30120-36W-TC

Report Type:	Electrical and Photometric tests including: Luminous Flux, Power Factor, Chromaticity, Luminous Intensity Distribution
Reviewed By:	Ezer Pan <i>Ezer Pan</i>
Report Number:	DG5240229-10009E-EE
Test Date:	2024-03-11 to 2024-03-12
Report Date:	2024-04-01
Approved by:	Blake Zhang / EE Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.12, Pulong East 1 st Road, Tangxia Town, Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588

1. Product Description[#]

General Information:

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

Model Tested: UL-PL30120-36W-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: 36W
Nominal CCT: 4000/5000K
Nominal Lumen Output: 4680lm

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.

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 $U=2.1\%$ ($K=2$), 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 (γ) 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 (γ) 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**

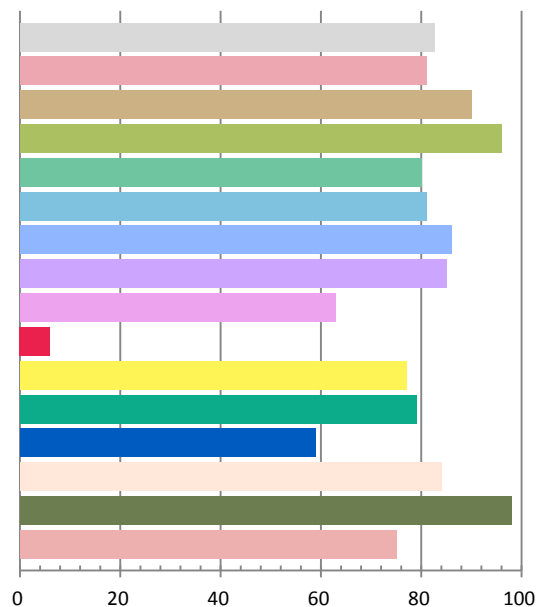
Photometric and Electrical Measurement Result

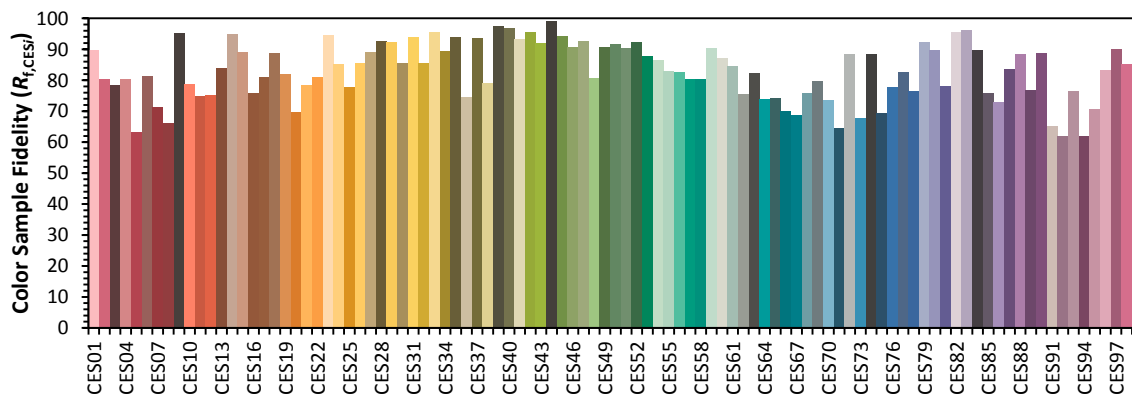
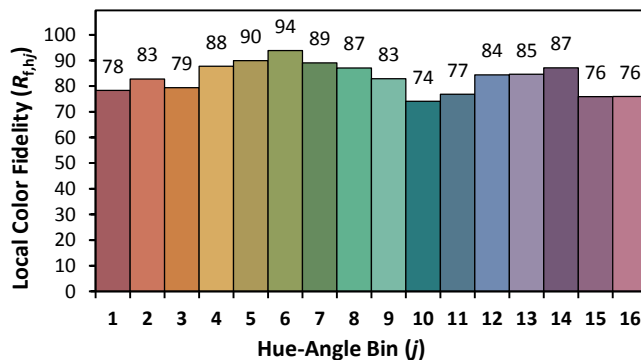
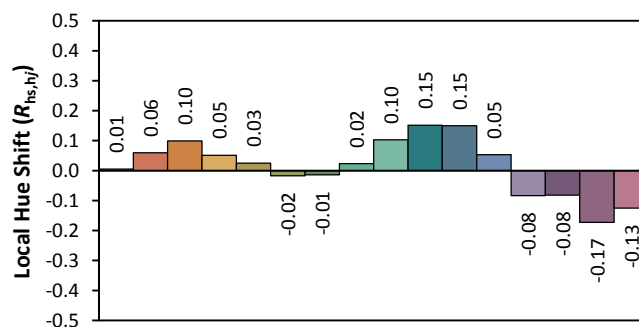
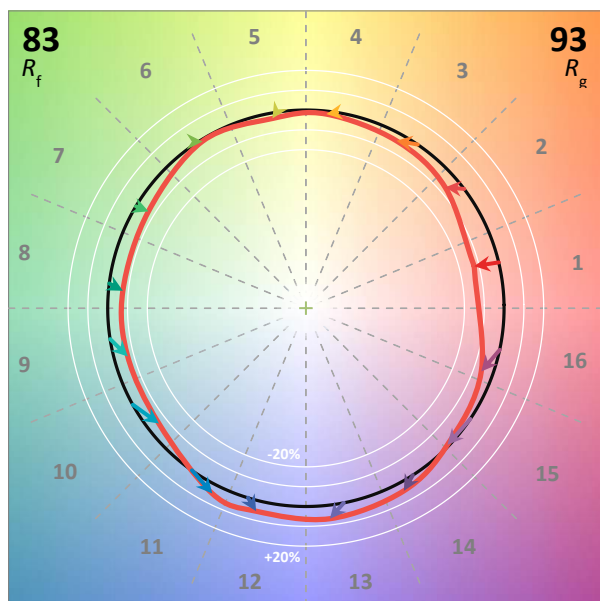
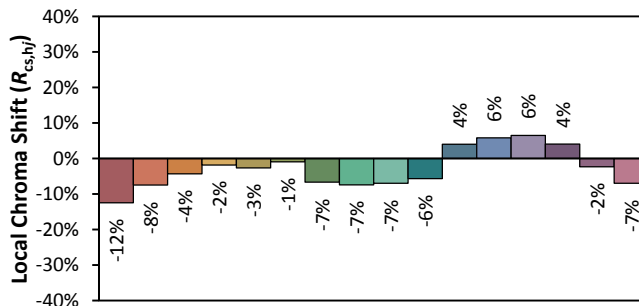
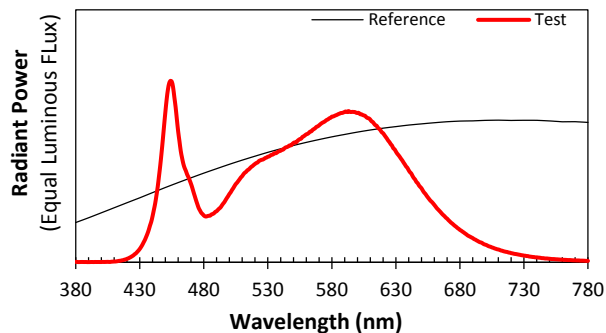
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
230.0	50	0.157	35.31	0.9777	4691.1	132.86

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
14.09	4014	0.00086	0.3803	0.3785	0.2243	0.5024

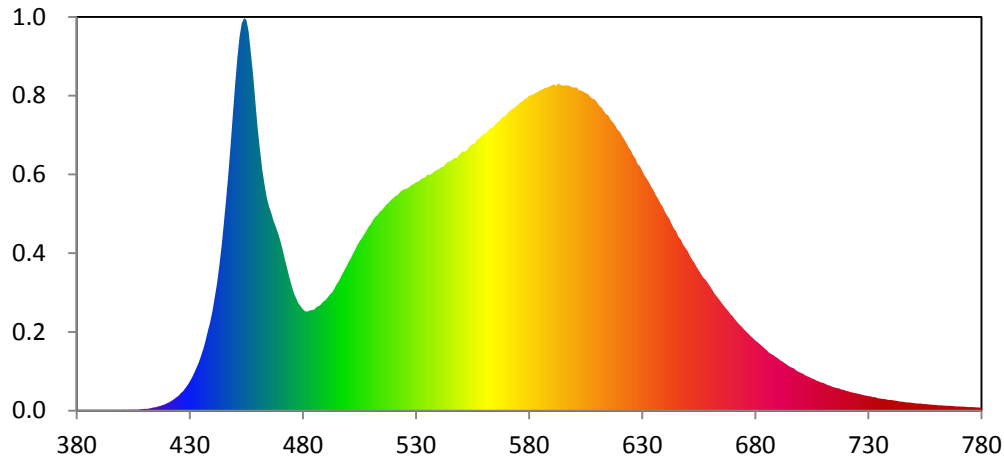
Color Rendering Index

Ra			
82.7			
R1	R2	R3	R4
81	90	96	80
R5	R6	R7	R8
81	86	85	63
R9	R10	R11	R12
6	77	79	59
R13	R14	R15	
84	98	75	





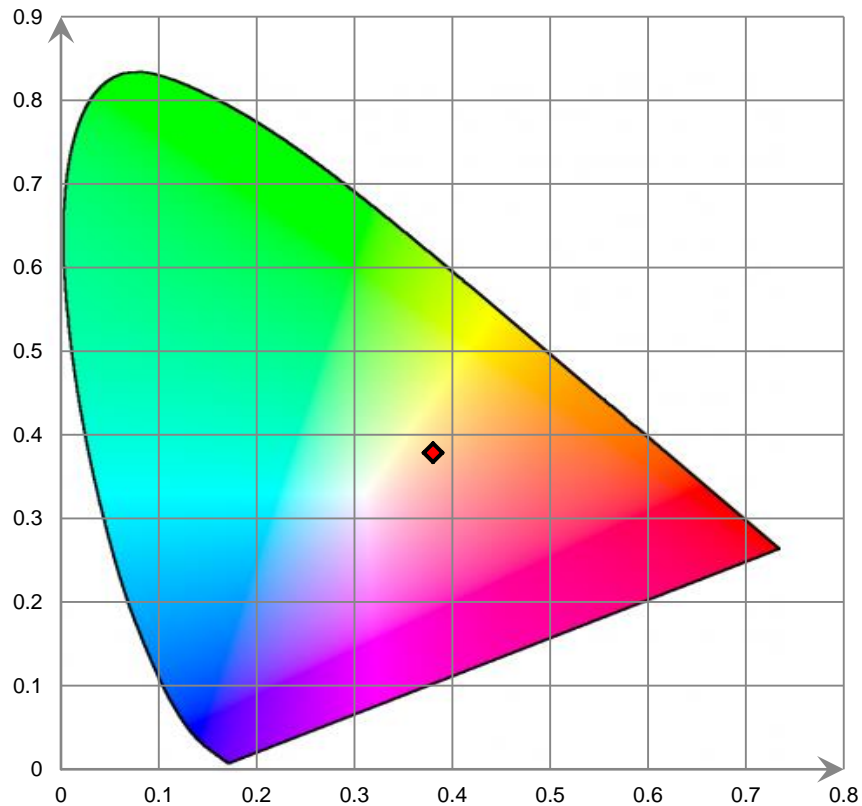
Relative Spectral Power Distribution



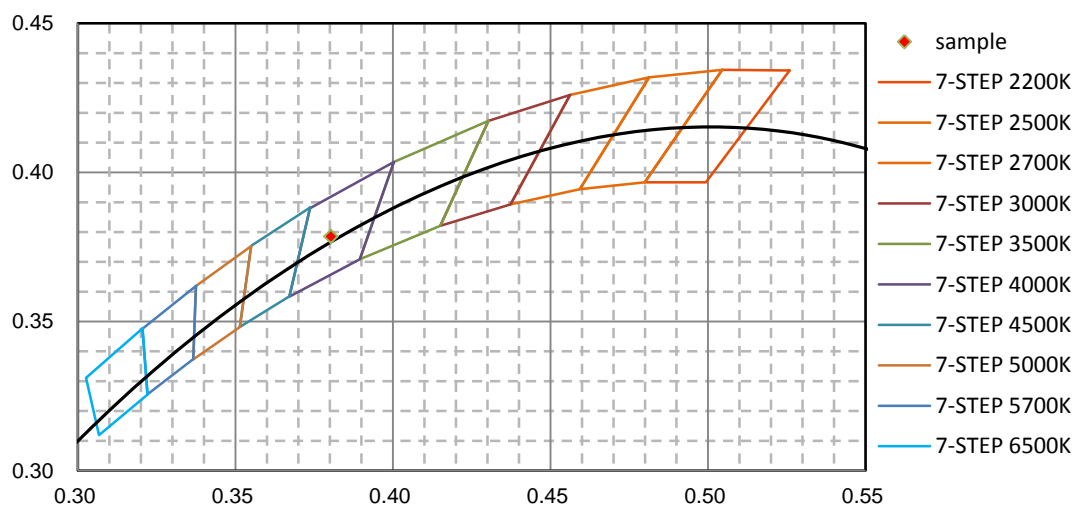
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.549E-01	421	2.161E+00	462	6.061E+01	503	4.035E+01	544	6.255E+01
381	2.126E-01	422	2.525E+00	463	5.693E+01	504	4.154E+01	545	6.274E+01
382	1.472E-01	423	2.885E+00	464	5.370E+01	505	4.261E+01	546	6.311E+01
383	1.672E-01	424	3.331E+00	465	5.140E+01	506	4.337E+01	547	6.364E+01
384	1.985E-01	425	3.771E+00	466	4.978E+01	507	4.431E+01	548	6.358E+01
385	2.020E-01	426	4.417E+00	467	4.779E+01	508	4.524E+01	549	6.429E+01
386	1.868E-01	427	4.893E+00	468	4.636E+01	509	4.622E+01	550	6.493E+01
387	1.700E-01	428	5.678E+00	469	4.459E+01	510	4.693E+01	551	6.527E+01
388	1.895E-01	429	6.427E+00	470	4.272E+01	511	4.797E+01	552	6.520E+01
389	1.384E-01	430	7.317E+00	471	4.055E+01	512	4.874E+01	553	6.599E+01
390	1.421E-01	431	8.352E+00	472	3.814E+01	513	4.926E+01	554	6.660E+01
391	1.527E-01	432	9.515E+00	473	3.590E+01	514	5.007E+01	555	6.706E+01
392	1.883E-01	433	1.089E+01	474	3.361E+01	515	5.051E+01	556	6.729E+01
393	1.862E-01	434	1.222E+01	475	3.154E+01	516	5.120E+01	557	6.822E+01
394	1.564E-01	435	1.389E+01	476	2.955E+01	517	5.190E+01	558	6.857E+01
395	1.983E-01	436	1.562E+01	477	2.827E+01	518	5.238E+01	559	6.912E+01
396	1.857E-01	437	1.764E+01	478	2.698E+01	519	5.301E+01	560	6.964E+01
397	1.917E-01	438	2.005E+01	479	2.628E+01	520	5.355E+01	561	6.990E+01
398	1.956E-01	439	2.219E+01	480	2.551E+01	521	5.405E+01	562	7.042E+01
399	1.781E-01	440	2.516E+01	481	2.503E+01	522	5.433E+01	563	7.112E+01
400	1.780E-01	441	2.852E+01	482	2.496E+01	523	5.510E+01	564	7.128E+01
401	2.353E-01	442	3.195E+01	483	2.520E+01	524	5.544E+01	565	7.208E+01
402	1.972E-01	443	3.633E+01	484	2.534E+01	525	5.576E+01	566	7.252E+01
403	2.232E-01	444	4.105E+01	485	2.544E+01	526	5.590E+01	567	7.302E+01
404	2.455E-01	445	4.682E+01	486	2.607E+01	527	5.628E+01	568	7.372E+01
405	2.738E-01	446	5.279E+01	487	2.632E+01	528	5.677E+01	569	7.400E+01
406	2.203E-01	447	5.954E+01	488	2.675E+01	529	5.702E+01	570	7.453E+01
407	2.347E-01	448	6.677E+01	489	2.746E+01	530	5.746E+01	571	7.516E+01
408	3.551E-01	449	7.447E+01	490	2.783E+01	531	5.763E+01	572	7.567E+01
409	3.898E-01	450	8.182E+01	491	2.855E+01	532	5.814E+01	573	7.611E+01
410	4.521E-01	451	8.866E+01	492	2.925E+01	533	5.851E+01	574	7.644E+01
411	4.705E-01	452	9.406E+01	493	2.983E+01	534	5.867E+01	575	7.695E+01
412	5.632E-01	453	9.750E+01	494	3.084E+01	535	5.937E+01	576	7.749E+01
413	6.798E-01	454	9.875E+01	495	3.185E+01	536	5.933E+01	577	7.778E+01
414	8.281E-01	455	9.827E+01	496	3.270E+01	537	5.964E+01	578	7.838E+01
415	8.835E-01	456	9.532E+01	497	3.386E+01	538	6.018E+01	579	7.863E+01
416	1.079E+00	457	8.986E+01	498	3.499E+01	539	6.048E+01	580	7.927E+01
417	1.182E+00	458	8.442E+01	499	3.603E+01	540	6.072E+01	581	7.935E+01
418	1.448E+00	459	7.762E+01	500	3.720E+01	541	6.120E+01	582	7.966E+01
419	1.602E+00	460	7.111E+01	501	3.812E+01	542	6.135E+01	583	7.999E+01
420	1.912E+00	461	6.589E+01	502	3.933E+01	543	6.206E+01	584	8.025E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	8.064E+01	626	6.428E+01	667	2.572E+01	708	7.383E+00	749	2.001E+00
586	8.090E+01	627	6.347E+01	668	2.510E+01	709	7.118E+00	750	1.943E+00
587	8.122E+01	628	6.205E+01	669	2.431E+01	710	6.995E+00	751	1.853E+00
588	8.128E+01	629	6.149E+01	670	2.378E+01	711	6.767E+00	752	1.785E+00
589	8.151E+01	630	6.028E+01	671	2.300E+01	712	6.451E+00	753	1.789E+00
590	8.186E+01	631	5.918E+01	672	2.234E+01	713	6.317E+00	754	1.735E+00
591	8.209E+01	632	5.834E+01	673	2.164E+01	714	6.045E+00	755	1.662E+00
592	8.172E+01	633	5.742E+01	674	2.111E+01	715	5.880E+00	756	1.644E+00
593	8.232E+01	634	5.636E+01	675	2.049E+01	716	5.713E+00	757	1.573E+00
594	8.189E+01	635	5.544E+01	676	1.988E+01	717	5.614E+00	758	1.521E+00
595	8.179E+01	636	5.429E+01	677	1.937E+01	718	5.339E+00	759	1.471E+00
596	8.187E+01	637	5.327E+01	678	1.873E+01	719	5.260E+00	760	1.438E+00
597	8.181E+01	638	5.215E+01	679	1.825E+01	720	5.009E+00	761	1.362E+00
598	8.176E+01	639	5.139E+01	680	1.766E+01	721	4.893E+00	762	1.363E+00
599	8.139E+01	640	5.009E+01	681	1.724E+01	722	4.700E+00	763	1.318E+00
600	8.127E+01	641	4.904E+01	682	1.672E+01	723	4.574E+00	764	1.263E+00
601	8.135E+01	642	4.833E+01	683	1.624E+01	724	4.478E+00	765	1.234E+00
602	8.060E+01	643	4.700E+01	684	1.571E+01	725	4.336E+00	766	1.246E+00
603	8.056E+01	644	4.584E+01	685	1.523E+01	726	4.193E+00	767	1.174E+00
604	8.019E+01	645	4.505E+01	686	1.465E+01	727	4.075E+00	768	1.119E+00
605	7.991E+01	646	4.373E+01	687	1.427E+01	728	3.898E+00	769	1.092E+00
606	7.966E+01	647	4.309E+01	688	1.393E+01	729	3.810E+00	770	1.074E+00
607	7.891E+01	648	4.187E+01	689	1.353E+01	730	3.647E+00	771	1.034E+00
608	7.850E+01	649	4.104E+01	690	1.319E+01	731	3.604E+00	772	1.030E+00
609	7.829E+01	650	4.027E+01	691	1.266E+01	732	3.431E+00	773	1.015E+00
610	7.764E+01	651	3.907E+01	692	1.237E+01	733	3.411E+00	774	9.339E-01
611	7.672E+01	652	3.801E+01	693	1.193E+01	734	3.193E+00	775	9.311E-01
612	7.632E+01	653	3.726E+01	694	1.157E+01	735	3.105E+00	776	9.119E-01
613	7.538E+01	654	3.623E+01	695	1.114E+01	736	3.006E+00	777	8.809E-01
614	7.461E+01	655	3.530E+01	696	1.088E+01	737	2.909E+00	778	8.220E-01
615	7.428E+01	656	3.440E+01	697	1.066E+01	738	2.855E+00	779	7.877E-01
616	7.315E+01	657	3.353E+01	698	1.018E+01	739	2.696E+00	780	7.796E-01
617	7.260E+01	658	3.290E+01	699	9.795E+00	740	2.721E+00		
618	7.180E+01	659	3.212E+01	700	9.587E+00	741	2.599E+00		
619	7.075E+01	660	3.125E+01	701	9.309E+00	742	2.545E+00		
620	7.027E+01	661	3.036E+01	702	8.913E+00	743	2.443E+00		
621	6.927E+01	662	2.943E+01	703	8.641E+00	744	2.290E+00		
622	6.829E+01	663	2.873E+01	704	8.449E+00	745	2.288E+00		
623	6.733E+01	664	2.799E+01	705	8.104E+00	746	2.168E+00		
624	6.623E+01	665	2.724E+01	706	7.911E+00	747	2.097E+00		
625	6.539E+01	666	2.642E+01	707	7.586E+00	748	2.104E+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**

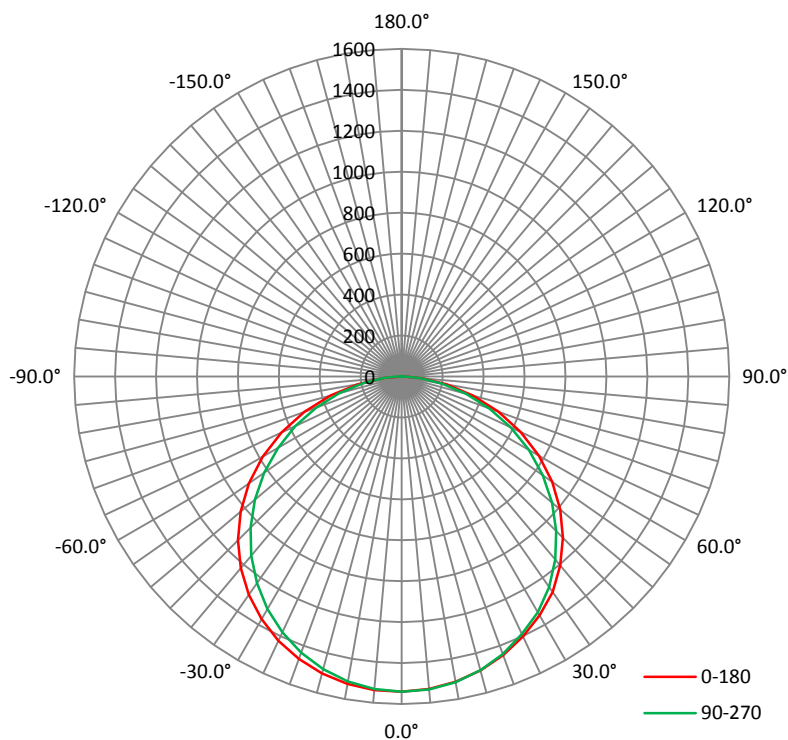
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
230.00	50	0.1571	35.330	0.9778

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
4692	132.80	1540	1.31	1.29

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	120.7	117.6	114.9	117.8	117.8
Field Angle (10% I_{max}):	165.0	164.4	163.9	164.6	164.5

Luminous Intensity (cd) Distribution Data

C Y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0°	1540	1540	1540	1540	1540	1540	1540	1540
1°	1540	1540	1540	1540	1540	1540	1540	1539
2°	1540	1540	1540	1539	1538	1539	1539	1538
3°	1540	1539	1539	1538	1537	1538	1538	1537
4°	1539	1538	1538	1536	1535	1537	1536	1535
5°	1538	1537	1536	1534	1532	1534	1534	1533
6°	1536	1535	1533	1531	1530	1531	1531	1531
7°	1534	1533	1531	1528	1526	1529	1528	1528
8°	1531	1530	1528	1524	1522	1525	1525	1524
9°	1529	1527	1524	1520	1517	1520	1521	1521
10°	1525	1523	1520	1516	1513	1516	1516	1516
11°	1521	1519	1515	1510	1507	1511	1511	1512
12°	1517	1515	1510	1505	1501	1505	1506	1507
13°	1512	1510	1505	1499	1494	1499	1500	1501
14°	1507	1504	1499	1492	1488	1492	1493	1495
15°	1502	1499	1492	1485	1480	1485	1487	1489
16°	1496	1493	1485	1478	1472	1478	1480	1482
17°	1490	1486	1478	1470	1464	1470	1472	1475
18°	1483	1479	1471	1462	1455	1462	1465	1468
19°	1476	1471	1463	1453	1445	1454	1456	1460
20°	1468	1464	1454	1443	1435	1444	1447	1452
21°	1461	1456	1445	1433	1425	1434	1438	1443
22°	1453	1447	1436	1423	1414	1424	1428	1434
23°	1444	1438	1425	1412	1403	1413	1418	1424
24°	1434	1428	1415	1400	1391	1402	1407	1414
25°	1424	1418	1403	1389	1379	1390	1396	1404
26°	1414	1407	1392	1376	1366	1379	1385	1393
27°	1403	1396	1380	1364	1354	1366	1372	1381
28°	1392	1384	1368	1350	1339	1353	1360	1370
29°	1381	1372	1355	1337	1325	1340	1348	1357
30°	1368	1360	1342	1322	1311	1326	1334	1345
31°	1356	1347	1328	1307	1296	1311	1321	1332
32°	1343	1334	1314	1293	1281	1297	1306	1318
33°	1330	1320	1299	1277	1265	1281	1292	1305
34°	1316	1306	1284	1261	1249	1266	1276	1291
35°	1301	1291	1268	1245	1232	1250	1261	1276
36°	1286	1275	1252	1229	1215	1234	1246	1261
37°	1271	1260	1236	1211	1198	1217	1229	1245
38°	1255	1244	1219	1194	1180	1199	1213	1230
39°	1239	1227	1201	1176	1161	1182	1196	1213
40°	1222	1210	1184	1157	1143	1164	1178	1196
41°	1205	1193	1166	1138	1124	1145	1161	1179
42°	1187	1174	1147	1119	1104	1127	1142	1161
43°	1168	1156	1128	1099	1084	1107	1123	1142
44°	1149	1136	1108	1079	1064	1087	1104	1124
45°	1131	1117	1088	1059	1043	1067	1085	1105
46°	1111	1097	1067	1039	1023	1047	1065	1085
47°	1091	1076	1047	1017	1001	1026	1044	1066
48°	1070	1056	1025	996	980	1005	1024	1045
49°	1048	1034	1004	973	958	984	1003	1025

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
50°	1027	1013	981	951	936	962	981	1004
51°	1005	990	959	929	913	939	960	982
52°	982	967	936	906	890	918	938	961
53°	959	944	913	883	867	895	915	938
54°	935	920	889	859	843	872	892	915
55°	911	897	865	835	820	849	869	892
56°	887	872	841	811	796	824	845	869
57°	862	847	816	786	772	801	821	845
58°	836	821	791	762	747	777	797	820
59°	810	795	765	736	722	752	773	796
60°	785	770	740	711	697	727	747	771
61°	758	743	714	686	672	702	723	746
62°	730	716	687	660	648	677	697	720
63°	703	689	661	635	624	664	671	694
64°	675	661	635	611	600	635	647	668
65°	648	635	610	586	574	605	622	643
66°	621	608	584	559	548	579	598	618
67°	594	582	556	533	522	553	572	592
68°	565	553	529	506	495	527	545	565
69°	536	524	501	479	469	501	518	537
70°	506	495	473	452	443	474	491	510
71°	477	466	445	426	417	448	464	482
72°	447	437	417	399	391	422	437	454
73°	418	408	390	373	366	396	410	426
74°	388	379	362	347	340	370	384	398
75°	358	351	335	321	315	344	357	370
76°	329	322	308	295	290	319	330	342
77°	300	294	282	270	265	294	305	315
78°	271	266	256	245	241	269	278	288
79°	243	239	230	221	217	244	253	262
80°	215	212	205	197	194	220	228	235
81°	187	185	180	173	171	197	203	209
82°	161	159	155	151	149	174	179	184
83°	135	134	132	129	127	152	156	160
84°	111	110	109	107	107	130	133	136
85°	87	87	87	87	87	109	111	113
86°	64	64	66	68	69	89	90	91
87°	42	46	49	51	53	70	70	70
88°	21	27	31	33	43	53	54	49
89°	4	8	14	17	32	37	38	40
90°	2	4	9	11	21	21	22	30
91°	0	0	5	6	11	14	15	20
92°	0	0	0	0	0	7	7	10
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	1	1	1	0	0
109°	0	0	0	1	1	1	0	0
110°	0	1	1	1	1	1	1	0
111°	1	1	1	1	1	1	1	0
112°	1	1	1	1	1	1	1	1
113°	1	1	1	1	1	1	1	1
114°	1	1	1	1	1	1	1	1
115°	1	1	1	1	1	1	1	1
116°	1	1	1	1	1	1	1	1
117°	1	1	1	1	1	1	1	1
118°	1	1	1	1	1	1	1	1
119°	1	1	1	1	1	1	1	1
120°	1	1	1	1	1	1	1	1
121°	1	1	1	1	1	1	1	1
122°	1	1	1	1	1	1	1	1
123°	1	1	1	1	1	1	1	1
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	2	2	1	1	1
141°	1	1	2	2	2	1	1	1
142°	1	2	2	2	2	2	1	1
143°	1	2	2	2	2	2	2	1
144°	2	2	2	2	2	2	2	1
145°	2	2	2	2	2	2	2	2
146°	2	2	2	2	2	2	2	2
147°	2	2	2	2	2	2	2	2
148°	2	2	2	2	2	2	2	2
149°	2	2	2	2	2	2	2	2

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
150°	2	2	2	2	2	2	2	2
151°	2	2	2	2	2	2	2	2
152°	2	2	2	2	2	2	2	2
153°	2	2	2	2	2	2	2	2
154°	2	2	2	2	2	2	2	2
155°	2	2	2	2	2	2	2	2
156°	2	2	2	2	2	2	2	2
157°	2	2	2	2	2	2	2	2
158°	2	2	2	3	2	2	2	2
159°	2	2	2	3	2	2	2	2
160°	2	2	2	3	2	2	2	2
161°	2	2	2	3	2	2	2	2
162°	2	2	2	3	2	2	2	2
163°	2	2	2	3	3	2	2	2
164°	2	2	2	2	3	2	2	2
165°	2	2	2	2	2	2	2	2
166°	2	2	2	2	2	2	2	2
167°	2	2	2	2	2	2	2	2
168°	2	2	2	2	2	2	2	2
169°	2	2	2	2	2	2	2	2
170°	2	2	2	2	2	2	2	2
171°	2	2	2	2	2	2	2	2
172°	2	2	2	2	2	2	2	2
173°	2	2	2	2	2	2	2	2
174°	2	2	2	2	2	2	2	2
175°	2	2	2	2	2	2	2	2
176°	2	2	2	2	2	2	2	2
177°	2	2	2	2	2	2	2	2
178°	2	2	2	2	2	2	2	2
179°	2	2	2	2	2	2	2	2
180°	2	2	2	2	2	2	2	2

Luminous Intensity (cd) Distribution Data (cont.)

C Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0°	1540	1540	1540	1540	1540	1540	1540	1540
1°	1539	1539	1539	1540	1540	1540	1540	1540
2°	1538	1538	1538	1539	1539	1539	1539	1539
3°	1536	1536	1537	1538	1538	1538	1538	1538
4°	1534	1535	1535	1536	1537	1536	1537	1538
5°	1532	1532	1533	1534	1534	1534	1535	1536
6°	1529	1529	1530	1531	1532	1531	1532	1534
7°	1526	1526	1527	1527	1529	1528	1529	1531
8°	1522	1522	1523	1524	1525	1524	1526	1528
9°	1519	1519	1519	1520	1521	1519	1522	1525
10°	1514	1514	1514	1515	1517	1515	1518	1521
11°	1510	1509	1509	1510	1511	1509	1513	1517
12°	1504	1504	1504	1504	1506	1504	1508	1512
13°	1499	1498	1498	1498	1500	1498	1503	1507
14°	1493	1492	1491	1491	1493	1491	1497	1502
15°	1486	1486	1485	1484	1486	1484	1490	1496
16°	1480	1479	1477	1476	1478	1476	1483	1489
17°	1472	1471	1469	1468	1470	1468	1476	1483
18°	1465	1464	1462	1460	1462	1460	1468	1476
19°	1457	1456	1453	1451	1453	1450	1460	1468
20°	1449	1447	1444	1442	1443	1441	1451	1460
21°	1440	1438	1434	1431	1433	1431	1442	1452
22°	1431	1429	1425	1421	1422	1420	1432	1442
23°	1421	1419	1414	1410	1411	1409	1422	1433
24°	1412	1409	1403	1398	1400	1398	1411	1423
25°	1401	1398	1392	1387	1388	1386	1400	1413
26°	1390	1387	1381	1375	1376	1373	1388	1402
27°	1379	1376	1369	1362	1363	1361	1377	1391
28°	1368	1364	1356	1351	1352	1349	1364	1379
29°	1357	1353	1347	1340	1341	1338	1352	1367
30°	1347	1343	1337	1330	1330	1328	1342	1355
31°	1338	1334	1327	1319	1319	1317	1332	1346
32°	1329	1324	1313	1304	1304	1301	1322	1336
33°	1315	1310	1298	1288	1289	1286	1307	1326
34°	1301	1296	1283	1272	1273	1270	1291	1312
35°	1286	1280	1267	1256	1256	1253	1275	1296
36°	1270	1264	1251	1239	1239	1236	1259	1281
37°	1255	1249	1234	1222	1221	1218	1242	1265
38°	1239	1232	1217	1204	1204	1200	1225	1248
39°	1222	1215	1200	1186	1185	1182	1207	1231
40°	1205	1198	1182	1168	1167	1163	1190	1214
41°	1188	1181	1163	1149	1148	1144	1170	1196
42°	1170	1162	1145	1130	1128	1124	1151	1177
43°	1151	1144	1125	1110	1108	1104	1132	1158
44°	1133	1125	1106	1090	1088	1083	1112	1139
45°	1114	1105	1086	1069	1067	1062	1091	1119
46°	1094	1085	1065	1048	1046	1041	1070	1099
47°	1074	1065	1045	1027	1025	1020	1049	1078
48°	1053	1044	1023	1006	1003	998	1027	1056
49°	1032	1023	1002	983	981	975	1005	1034

Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
50°	1011	1002	980	961	958	953	982	1012
51°	989	979	958	939	936	929	959	989
52°	967	957	935	916	913	906	936	966
53°	944	934	912	892	889	882	912	942
54°	921	911	888	869	866	858	888	918
55°	897	887	865	845	841	833	863	893
56°	874	863	841	820	817	808	838	868
57°	849	839	816	796	792	783	813	843
58°	824	814	791	771	767	758	788	817
59°	799	789	766	746	742	732	761	791
60°	774	763	740	721	717	706	735	764
61°	748	738	715	695	691	680	708	737
62°	722	712	689	669	665	653	681	709
63°	695	685	663	643	639	627	654	682
64°	668	658	636	617	613	600	627	654
65°	641	631	609	591	587	574	599	626
66°	614	604	583	565	561	546	571	597
67°	586	577	556	538	534	519	543	568
68°	558	549	529	512	507	492	515	539
69°	530	521	502	485	481	465	488	511
70°	502	494	475	459	455	438	459	481
71°	473	466	448	432	428	412	431	452
72°	445	437	421	406	402	385	404	423
73°	417	410	394	380	376	358	376	394
74°	388	381	367	354	350	332	348	365
75°	360	354	340	328	324	306	321	337
76°	332	326	314	302	299	280	294	308
77°	304	299	288	277	274	255	267	280
78°	277	272	262	252	250	230	241	252
79°	250	246	236	228	225	206	216	224
80°	224	220	212	204	202	182	190	197
81°	197	194	187	181	179	159	166	172
82°	172	169	163	158	156	137	141	146
83°	148	145	140	136	134	114	117	120
84°	123	120	116	113	112	93	95	96
85°	100	98	95	93	92	74	73	74
86°	78	77	75	74	73	56	54	52
87°	57	56	55	57	57	38	40	35
88°	37	37	39	43	43	20	27	18
89°	25	25	26	29	29	1	14	1
90°	12	13	13	15	15	0	0	0
91°	0	0	0	1	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°	1	1	1	0	0	0	0	0
123°	1	1	1	1	0	0	0	0
124°	1	1	1	1	0	0	1	1
125°	1	1	1	1	0	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	1	1	1	1

Luminous Intensity (cd) Distribution Data (cont.)

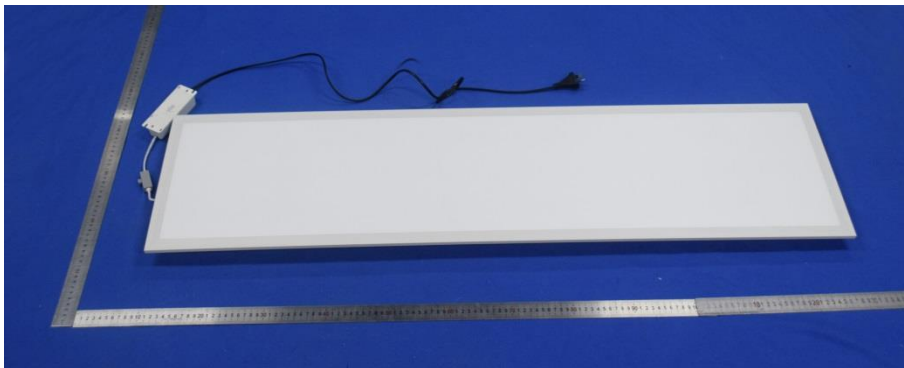
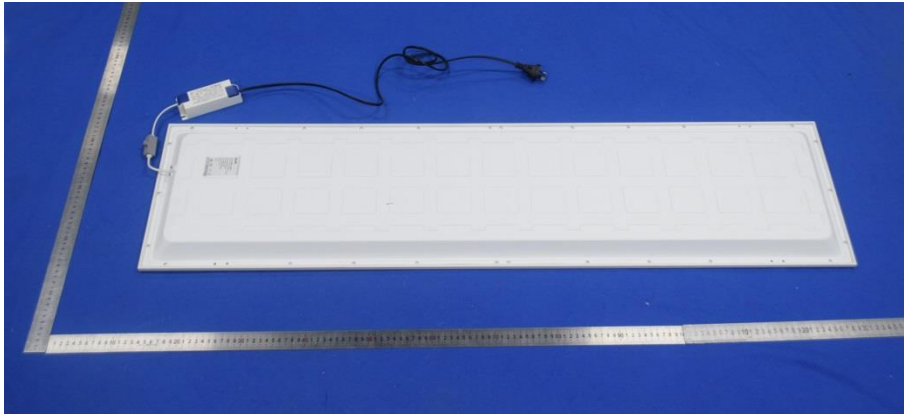
C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
150°	1	1	1	1	1	1	1	1
151°	1	1	1	1	1	1	1	1
152°	1	1	1	1	1	1	1	1
153°	1	1	1	1	1	1	1	1
154°	1	1	1	1	1	1	1	1
155°	1	1	1	1	1	1	1	1
156°	1	1	1	1	1	1	1	1
157°	1	1	1	1	1	1	1	1
158°	1	1	1	1	1	1	1	1
159°	1	1	1	1	1	1	1	1
160°	1	1	1	1	1	1	1	1
161°	1	1	1	1	1	1	1	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°	2	2	1	1	1	1	1	1
169°	2	2	1	1	1	1	1	1
170°	2	2	1	1	1	1	1	1
171°	2	2	1	1	1	1	1	1
172°	2	2	2	1	1	1	1	2
173°	2	2	2	1	1	1	1	2
174°	2	2	2	1	1	1	1	2
175°	2	2	2	2	1	1	2	2
176°	2	2	2	2	2	1	2	2
177°	2	2	2	2	2	2	2	2
178°	2	2	2	2	2	2	2	2
179°	2	2	2	2	2	2	2	2
180°	2	2	2	2	2	2	2	2

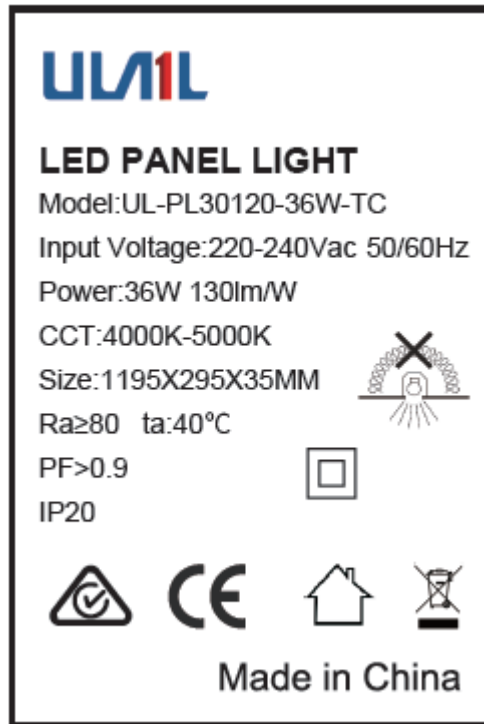
Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	36.7	0.78
5-10	109.1	2.33
10-15	178.3	3.80
15-20	242.1	5.16
20-25	298.6	6.36
25-30	346.2	7.38
30-35	384.3	8.19
35-40	409.1	8.72
40-45	420.7	8.97
45-50	418.4	8.91
50-55	402.0	8.57
55-60	371.8	7.93
60-65	328.9	7.00
65-70	275.2	5.87
70-75	212.6	4.53
75-80	145.9	3.11
80-85	80.7	1.72
85-90	25.5	0.54
90-95	1.4	0.03
95-100	0.2	0.01
100-105	0.2	0.00
105-110	0.2	0.00
110-115	0.2	0.01
115-120	0.3	0.00
120-125	0.3	0.01
125-130	0.3	0.01
130-135	0.3	0.00
135-140	0.4	0.01
140-145	0.4	0.01
145-150	0.4	0.01
150-155	0.4	0.01
155-160	0.4	0.01
160-165	0.3	0.00
165-170	0.2	0.01
170-175	0.1	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	36.7	0.78
0-10	145.9	3.11
0-15	324.2	6.91
0-20	566.3	12.07
0-25	864.9	18.43
0-30	1211.1	25.81
0-35	1595.3	34.00
0-40	2004.5	42.72
0-45	2425.2	51.69
0-50	2843.5	60.60
0-55	3245.5	69.17
0-60	3617.3	77.10
0-65	3946.2	84.10
0-70	4221.4	89.97
0-75	4434.0	94.50
0-80	4579.9	97.61
0-85	4660.5	99.33
0-90	4686.0	99.87
0-95	4687.4	99.90
0-100	4687.6	99.91
0-105	4687.8	99.91
0-110	4688.0	99.91
0-115	4688.2	99.92
0-120	4688.5	99.92
0-125	4688.7	99.93
0-130	4689.1	99.94
0-135	4689.4	99.94
0-140	4689.8	99.95
0-145	4690.2	99.96
0-150	4690.6	99.97
0-155	4691.0	99.98
0-160	4691.3	99.99
0-165	4691.6	99.99
0-170	4691.8	100.00
0-175	4692.0	100.00
0-180	4692.0	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.
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*****END OF REPORT*****