

ANSI/IES LM-79-19

MEASUREMENT AND TEST REPORT

For

P.Q.L., Inc.
2285 WARD AVE.SIMI VALLEY, CA 93065 United States

Test Model: SBT22303CUW

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:	2502S34431E-EE
Test Date:	2024-11-05 to 2025-05-20
Report Date:	2025-05-20
Approved by:	Blake Zhang / EE Engineer <i>Blake Zhang</i>
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 5F (B-West), 6F, 7F, the 3rd Phase of Wan Li Industrial Building D Shihua Road, Futian Free Trade Zone Shenzhen 518038 China Tel: +86-755-33320018 Fax: +86-755-33320008
Test Location 1:	Test facility was located at No.12, Pulong East 1 st Road, Tangxia Town, Dongguan, Guangdong, China.
Test Location 2:	Test facility was located at Room 301, No.113, Pingkang Road, Dalang, Dongguan, Guangdong, China.



Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.(Shenzhen). This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, or any agency of the U.S. Government. *This report contains data that are not covered by the NVLAP accreditation.

1. Product Description[#]

General Information:

One test sample was in good condition and received on 2024-10-25, and used for testing. All tests and evaluations were performed at the least efficient white light setting.

Model Tested: SBT22303CUW
Manufacturer: N/A
Brand Name: 
Product Designation: LED Luminaires
Burning Time Before Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: AC 120-277V 50/60Hz
Rated Power: 30W
Nominal CCT: 3000K/3500K/4000K
Nominal Lumen Output: 3810lm/3960lm/3870lm

Family Declaration

P.Q.L., Inc. declares that there are some differences between multiple models and tested model. Details as below:

Tested Model	Multiple Models	Variations	Details	Additional Test
SBT22303CUW	SBT22253CUW	Power	SBT22303CUW: 30W SBT22253CUW: 25W SBT22153CUW: 15W	See report 2502S34431E-EE-1
	SBT22153CUW			See report 2502S34431E-EE-2

2. Standards Used

- ANSI/IES LM-79-19: Approved method :Optical and Electrical Measurements of Solid-State Lighting Products
- ANSI C82.77-10-2014: Harmonic Emission Limits – Related Power Quality Requirements for Lighting
- *IES TM-30-18: IES Method for Evaluating Light Source Color Rendition (This method is not in NVLAP accreditation scope)

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	2024-07-25	2025-07-24
High-precision rapid spectral analysis system	EVERFINE	HAAS-2000	M112048CA1361125	2024-07-25	2025-07-24
Digital power meter	YOKOGAWA	WT310	13398	2024-07-25	2025-07-24
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11060010	2024-07-25	2025-07-24

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
thermometer	SENSING	N/A	N/A	2024-07-25	2025-07-24
Standard Light Source	EVERFINE	D204	N/A	2023-05-12	2026-05-11
Precision frequency power supply	ALL Power	APW-105N	970613	2024-07-25	2025-07-24
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	2024-08-30	2025-08-29
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	2024-08-30	2025-08-29
Digital power meter	YOKOGAWA	WT-210	91J926132	2024-08-30	2025-08-29
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	2024-07-25	2025-07-24
wireless remote thermohygrometer	N/A	AOK-5017B	N/A	2024-09-06	2025-09-05
Standard Light Source	EVERFINE	D908	N/A	2023-05-12	2026-05-11

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Shenzhen) 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 $U=0.39\%$ of rdg, AC Voltage $U=0.25\%$ of rdg, Power $U=0.42\%$ ($K=2$), 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 90 degree, The horizontal angle (C plane) test intervals were set no more than 10 degree

The uncertainty of the luminous intensity is $U=2.00\%$ ($K=2$), 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]

Test facility was located at Room 301, No.113, Pingkang Road, Dalang, Dongguan, Guangdong, China.

The diameter of the sphere: **1.5m**

The coating reflectance of sphere: **98%**

The Stabilization time: **30 minutes**

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

Test orientation: **Downward**

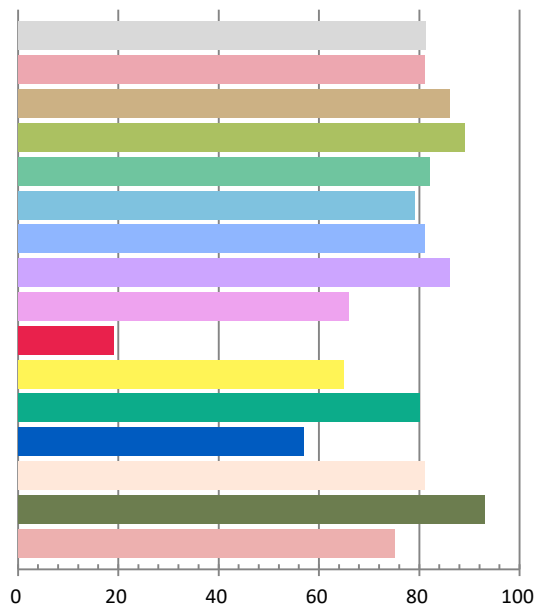
Photometric and Electrical Measurement Result

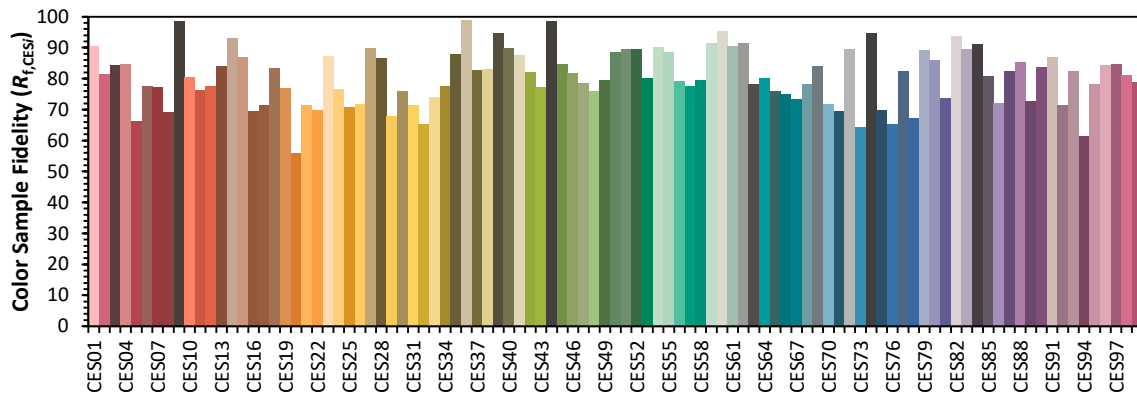
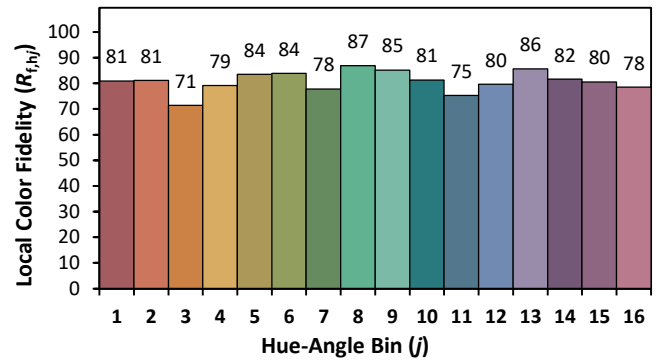
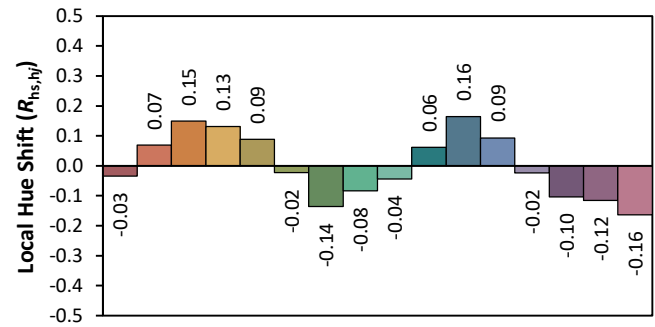
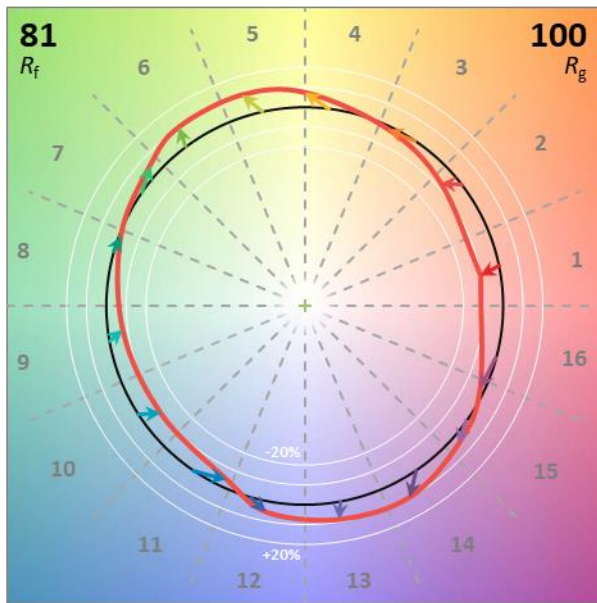
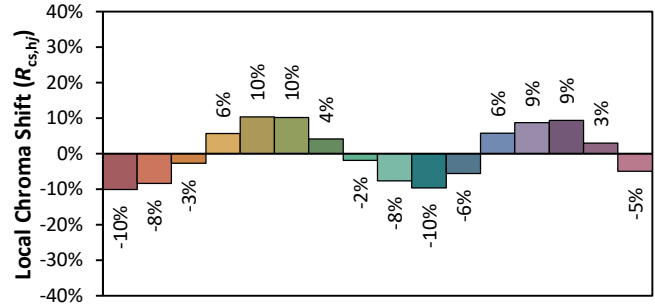
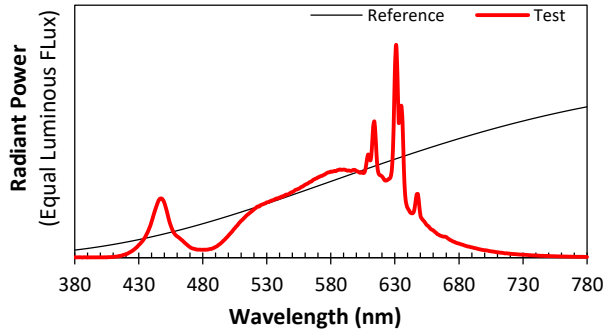
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.1	60	0.2399	28.63	0.994	3676.9	128.42

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.366	2942	0.00154	0.4434	0.4102	0.2521	0.5247

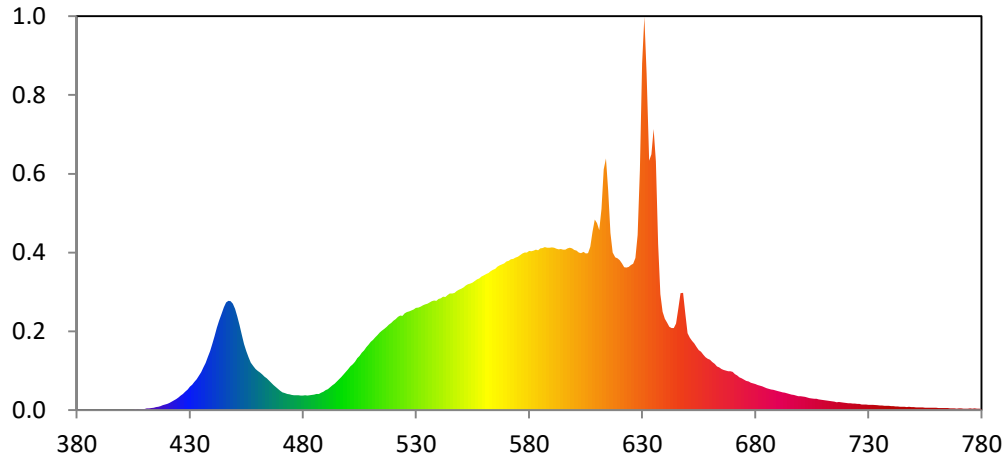
Color Rendering Index

Ra			
81.3			
R1	R2	R3	R4
81	86	89	82
R5	R6	R7	R8
79	81	86	66
R9	R10	R11	R12
19	65	80	57
R13	R14	R15	
81	93	75	





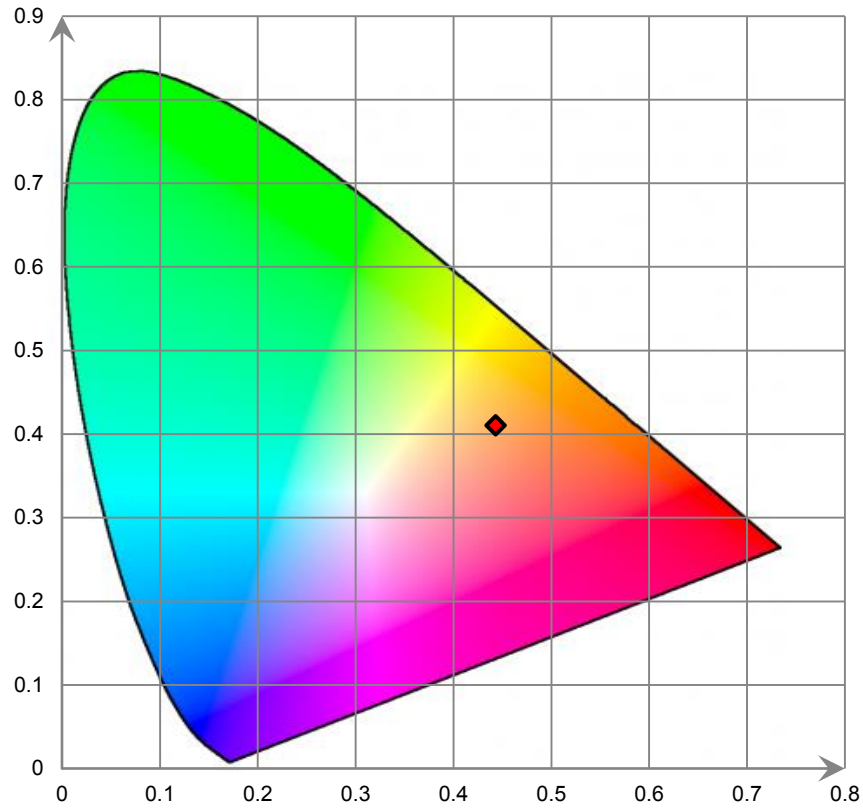
Relative Spectral Power Distribution



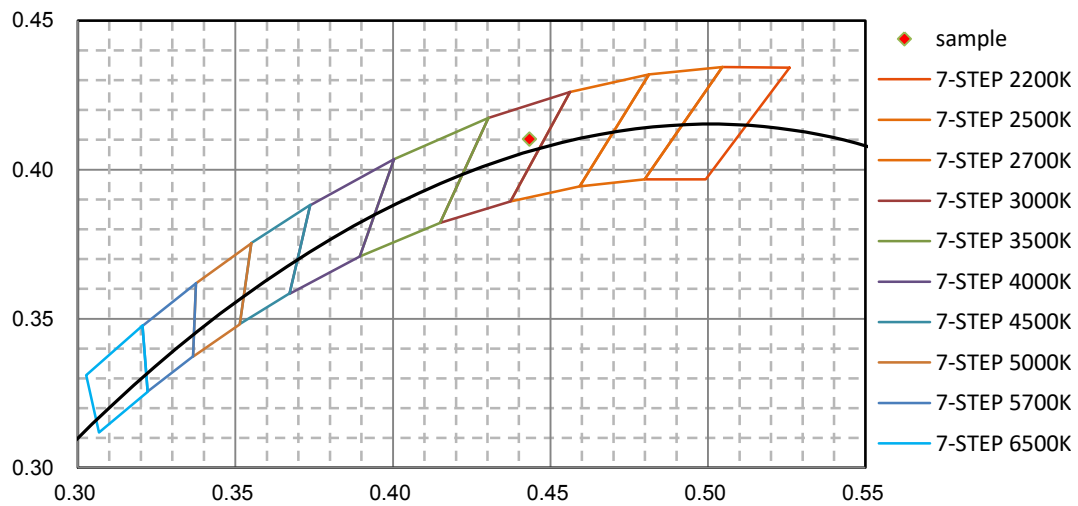
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.270E-01	421	2.799E+00	462	1.438E+01	503	1.954E+01	544	4.639E+01
381	1.020E-01	422	3.363E+00	463	1.348E+01	504	2.087E+01	545	4.696E+01
382	1.640E-01	423	3.912E+00	464	1.278E+01	505	2.184E+01	546	4.703E+01
383	1.739E-01	424	4.427E+00	465	1.184E+01	506	2.313E+01	547	4.725E+01
384	2.276E-01	425	5.054E+00	466	1.091E+01	507	2.396E+01	548	4.804E+01
385	1.410E-01	426	5.761E+00	467	1.012E+01	508	2.534E+01	549	4.858E+01
386	3.156E-02	427	6.489E+00	468	9.284E+00	509	2.638E+01	550	4.892E+01
387	2.086E-01	428	7.391E+00	469	8.464E+00	510	2.744E+01	551	4.943E+01
388	1.987E-01	429	8.215E+00	470	7.772E+00	511	2.824E+01	552	5.024E+01
389	1.278E-01	430	9.392E+00	471	7.139E+00	512	2.925E+01	553	5.072E+01
390	8.037E-02	431	1.020E+01	472	6.817E+00	513	3.022E+01	554	5.096E+01
391	2.060E-01	432	1.137E+01	473	6.507E+00	514	3.124E+01	555	5.143E+01
392	7.062E-02	433	1.245E+01	474	6.339E+00	515	3.204E+01	556	5.203E+01
393	1.749E-01	434	1.384E+01	475	6.000E+00	516	3.277E+01	557	5.275E+01
394	1.108E-01	435	1.530E+01	476	5.908E+00	517	3.361E+01	558	5.302E+01
395	1.515E-01	436	1.721E+01	477	5.920E+00	518	3.441E+01	559	5.381E+01
396	1.369E-01	437	1.903E+01	478	5.871E+00	519	3.511E+01	560	5.439E+01
397	1.337E-01	438	2.140E+01	479	5.841E+00	520	3.602E+01	561	5.486E+01
398	1.797E-01	439	2.372E+01	480	5.772E+00	521	3.667E+01	562	5.532E+01
399	1.444E-01	440	2.675E+01	481	5.903E+00	522	3.757E+01	563	5.601E+01
400	1.772E-01	441	2.987E+01	482	5.802E+00	523	3.814E+01	564	5.654E+01
401	1.989E-01	442	3.313E+01	483	5.909E+00	524	3.800E+01	565	5.690E+01
402	1.176E-01	443	3.607E+01	484	5.988E+00	525	3.900E+01	566	5.784E+01
403	1.799E-01	444	3.888E+01	485	6.207E+00	526	3.946E+01	567	5.836E+01
404	1.992E-01	445	4.149E+01	486	6.428E+00	527	3.976E+01	568	5.882E+01
405	9.428E-02	446	4.337E+01	487	6.504E+00	528	4.017E+01	569	5.920E+01
406	3.318E-01	447	4.409E+01	488	7.003E+00	529	4.059E+01	570	5.986E+01
407	2.305E-01	448	4.392E+01	489	7.381E+00	530	4.122E+01	571	6.018E+01
408	3.553E-01	449	4.286E+01	490	7.969E+00	531	4.131E+01	572	6.078E+01
409	3.658E-01	450	4.077E+01	491	8.395E+00	532	4.174E+01	573	6.091E+01
410	4.328E-01	451	3.765E+01	492	9.171E+00	533	4.225E+01	574	6.149E+01
411	6.214E-01	452	3.422E+01	493	9.867E+00	534	4.260E+01	575	6.190E+01
412	6.400E-01	453	3.028E+01	494	1.063E+01	535	4.285E+01	576	6.251E+01
413	7.646E-01	454	2.665E+01	495	1.147E+01	536	4.334E+01	577	6.315E+01
414	9.172E-01	455	2.377E+01	496	1.244E+01	537	4.386E+01	578	6.356E+01
415	1.205E+00	456	2.130E+01	497	1.330E+01	538	4.419E+01	579	6.361E+01
416	1.294E+00	457	1.915E+01	498	1.431E+01	539	4.410E+01	580	6.420E+01
417	1.562E+00	458	1.769E+01	499	1.531E+01	540	4.485E+01	581	6.405E+01
418	1.956E+00	459	1.657E+01	500	1.635E+01	541	4.505E+01	582	6.432E+01
419	2.214E+00	460	1.580E+01	501	1.750E+01	542	4.574E+01	583	6.467E+01
420	2.477E+00	461	1.513E+01	502	1.849E+01	543	4.554E+01	584	6.448E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	6.519E+01	626	5.900E+01	667	1.583E+01	708	4.208E+00	749	1.181E+00
586	6.535E+01	627	6.128E+01	668	1.558E+01	709	4.080E+00	750	1.114E+00
587	6.577E+01	628	7.059E+01	669	1.558E+01	710	3.989E+00	751	1.056E+00
588	6.548E+01	629	9.672E+01	670	1.539E+01	711	3.843E+00	752	1.016E+00
589	6.552E+01	630	1.399E+02	671	1.452E+01	712	3.692E+00	753	1.010E+00
590	6.565E+01	631	1.588E+02	672	1.389E+01	713	3.597E+00	754	1.018E+00
591	6.554E+01	632	1.359E+02	673	1.317E+01	714	3.506E+00	755	9.490E-01
592	6.512E+01	633	1.006E+02	674	1.279E+01	715	3.328E+00	756	9.242E-01
593	6.486E+01	634	1.032E+02	675	1.221E+01	716	3.102E+00	757	8.968E-01
594	6.500E+01	635	1.134E+02	676	1.178E+01	717	3.188E+00	758	8.569E-01
595	6.473E+01	636	1.004E+02	677	1.142E+01	718	3.081E+00	759	8.243E-01
596	6.466E+01	637	6.713E+01	678	1.095E+01	719	2.975E+00	760	8.491E-01
597	6.520E+01	638	4.670E+01	679	1.067E+01	720	2.831E+00	761	8.111E-01
598	6.547E+01	639	3.968E+01	680	1.042E+01	721	2.725E+00	762	7.634E-01
599	6.525E+01	640	3.685E+01	681	1.011E+01	722	2.684E+00	763	7.406E-01
600	6.452E+01	641	3.526E+01	682	9.763E+00	723	2.552E+00	764	7.138E-01
601	6.425E+01	642	3.359E+01	683	9.523E+00	724	2.571E+00	765	7.100E-01
602	6.360E+01	643	3.307E+01	684	9.129E+00	725	2.423E+00	766	6.719E-01
603	6.325E+01	644	3.312E+01	685	8.817E+00	726	2.391E+00	767	6.523E-01
604	6.382E+01	645	3.489E+01	686	8.520E+00	727	2.248E+00	768	6.350E-01
605	6.311E+01	646	4.076E+01	687	8.250E+00	728	2.230E+00	769	5.510E-01
606	6.324E+01	647	4.718E+01	688	8.131E+00	729	2.175E+00	770	6.336E-01
607	6.587E+01	648	4.728E+01	689	7.803E+00	730	2.095E+00	771	5.765E-01
608	7.198E+01	649	3.888E+01	690	7.640E+00	731	2.082E+00	772	5.621E-01
609	7.681E+01	650	3.105E+01	691	7.378E+00	732	2.011E+00	773	5.531E-01
610	7.542E+01	651	2.912E+01	692	7.070E+00	733	1.947E+00	774	5.466E-01
611	7.261E+01	652	2.786E+01	693	6.954E+00	734	1.867E+00	775	5.828E-01
612	8.110E+01	653	2.681E+01	694	6.711E+00	735	1.781E+00	776	4.841E-01
613	9.713E+01	654	2.541E+01	695	6.428E+00	736	1.757E+00	777	5.804E-01
614	1.015E+02	655	2.414E+01	696	6.197E+00	737	1.624E+00	778	4.634E-01
615	8.848E+01	656	2.351E+01	697	6.004E+00	738	1.657E+00	779	4.707E-01
616	7.144E+01	657	2.239E+01	698	5.772E+00	739	1.604E+00	780	4.119E-01
617	6.353E+01	658	2.132E+01	699	5.595E+00	740	1.566E+00		
618	6.166E+01	659	2.070E+01	700	5.507E+00	741	1.508E+00		
619	6.125E+01	660	2.027E+01	701	5.368E+00	742	1.389E+00		
620	6.044E+01	661	1.929E+01	702	5.273E+00	743	1.349E+00		
621	5.917E+01	662	1.864E+01	703	5.026E+00	744	1.290E+00		
622	5.766E+01	663	1.758E+01	704	4.791E+00	745	1.315E+00		
623	5.747E+01	664	1.718E+01	705	4.680E+00	746	1.288E+00		
624	5.770E+01	665	1.651E+01	706	4.499E+00	747	1.160E+00		
625	5.852E+01	666	1.618E+01	707	4.469E+00	748	1.243E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

Test facility was located at No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China.

The photometric distance: **2.519m**

The Stabilization time: **30 minutes**

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

Test orientation: **Downward**

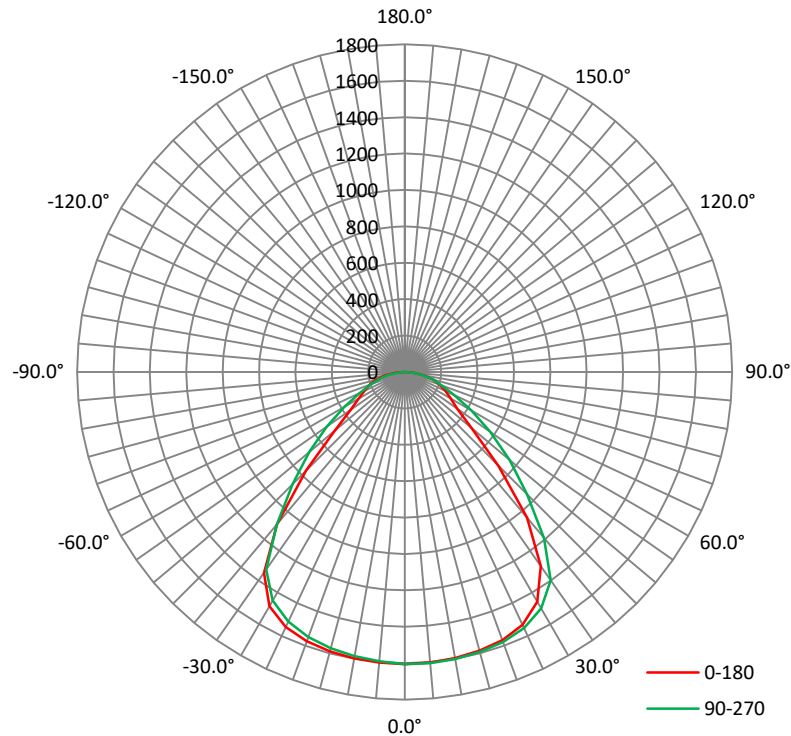
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.04	60	0.2400	28.640	0.9941

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
3678.32	128.43	1607	1.25	1.33

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	88.2	92.6	95.3	91.5	91.9
Field Angle (10% I_{max}):	150.2	148.6	148.1	148.9	149.0

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0°	1605	1605	1605	1605	1605	1605	1605	1605
1°	1605	1605	1604	1604	1604	1604	1604	1604
2°	1605	1604	1603	1602	1603	1602	1603	1604
3°	1605	1603	1602	1601	1601	1601	1601	1603
4°	1604	1602	1601	1599	1599	1599	1600	1602
5°	1603	1601	1599	1597	1596	1597	1598	1600
6°	1603	1600	1597	1595	1594	1595	1596	1599
7°	1602	1599	1595	1592	1592	1592	1594	1598
8°	1601	1597	1593	1591	1590	1591	1592	1596
9°	1600	1596	1591	1588	1588	1589	1590	1595
10°	1599	1594	1589	1586	1585	1586	1588	1592
11°	1597	1592	1587	1584	1583	1584	1586	1590
12°	1596	1590	1585	1582	1581	1582	1584	1588
13°	1594	1588	1583	1579	1578	1579	1582	1586
14°	1592	1586	1580	1577	1575	1576	1579	1584
15°	1590	1583	1577	1573	1572	1573	1575	1581
16°	1587	1581	1574	1570	1569	1569	1572	1577
17°	1585	1578	1570	1566	1564	1566	1568	1574
18°	1582	1575	1567	1562	1560	1561	1564	1570
19°	1579	1571	1562	1558	1555	1557	1559	1566
20°	1575	1567	1557	1553	1550	1551	1554	1561
21°	1570	1562	1552	1547	1544	1545	1548	1555
22°	1566	1557	1547	1541	1538	1539	1542	1549
23°	1560	1551	1540	1534	1531	1531	1534	1541
24°	1553	1544	1533	1526	1522	1523	1526	1533
25°	1546	1537	1525	1516	1513	1513	1517	1524
26°	1537	1528	1515	1506	1503	1502	1506	1514
27°	1527	1519	1505	1495	1492	1491	1495	1502
28°	1516	1507	1493	1482	1480	1477	1481	1487
29°	1502	1494	1479	1468	1466	1462	1466	1471
30°	1485	1479	1463	1452	1450	1444	1447	1453
31°	1466	1461	1446	1432	1433	1423	1426	1430
32°	1443	1441	1425	1411	1413	1399	1402	1405
33°	1416	1416	1401	1385	1388	1371	1373	1376
34°	1384	1388	1373	1356	1360	1339	1342	1343
35°	1348	1356	1340	1322	1326	1303	1304	1305
36°	1305	1319	1303	1283	1289	1259	1263	1263
37°	1260	1278	1263	1243	1246	1215	1217	1220
38°	1207	1237	1218	1204	1198	1170	1166	1177
39°	1151	1195	1169	1151	1146	1114	1113	1126
40°	1090	1145	1119	1095	1094	1055	1057	1073
41°	1027	1093	1066	1035	1044	994	1002	1019
42°	960	1041	1012	975	996	932	947	966
43°	894	989	958	913	951	870	892	917
44°	829	939	903	852	909	811	840	872
45°	764	891	850	793	869	752	789	829
46°	704	844	796	736	830	697	738	790
47°	647	801	745	683	791	645	691	751
48°	599	760	696	632	754	597	644	714

Luminous Intensity (cd) Distribution Data

$\gamma \backslash C$	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
49°	552	720	649	586	718	554	604	678
50°	505	682	612	544	682	516	565	644
51°	468	645	572	506	647	482	526	611
52°	434	610	531	472	614	452	493	579
53°	407	576	497	441	584	425	463	548
54°	383	544	468	415	554	401	436	518
55°	362	513	440	391	524	381	412	489
56°	344	484	416	370	494	362	390	462
57°	328	456	394	351	464	346	370	435
58°	314	430	374	334	436	331	351	410
59°	302	404	354	318	408	317	333	385
60°	291	379	336	304	381	304	316	361
61°	281	355	318	290	356	290	300	338
62°	272	332	301	278	332	277	284	316
63°	263	311	286	266	310	264	270	296
64°	254	290	270	255	289	252	256	276
65°	245	272	256	245	270	241	244	258
66°	236	255	242	236	253	231	233	241
67°	227	239	229	227	236	222	222	224
68°	218	224	216	218	222	213	212	210
69°	210	211	204	209	208	205	202	196
70°	203	199	194	200	196	198	193	184
71°	197	187	183	191	184	189	183	173
72°	190	177	175	182	173	181	174	164
73°	182	166	167	173	162	172	166	155
74°	172	156	160	164	150	162	157	147
75°	161	146	153	155	139	153	148	138
76°	149	136	145	144	127	141	139	130
77°	138	126	137	134	117	130	130	124
78°	127	118	127	123	108	119	121	117
79°	117	111	117	112	100	108	111	110
80°	107	103	106	100	90	96	101	101
81°	96	94	95	88	79	85	89	91
82°	85	84	83	75	67	73	78	79
83°	73	73	70	63	56	61	65	67
84°	60	62	57	49	45	48	53	56
85°	47	50	44	38	34	38	42	45
86°	34	37	31	29	26	29	30	33
87°	22	25	20	19	14	20	20	22
88°	10	14	8	10	5	10	6	12
89°	8	2	1	1	3	1	3	1
90°	0	0	0	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

Luminous Intensity (cd) Distribution Data

C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
98°	0	0	0	0	0	0	0	0
99°	0	0	0	0	0	0	0	0
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	0	0	0	0	0
137°	0	0	0	0	0	0	0	0
138°	0	0	0	0	0	0	0	0
139°	0	0	0	0	0	0	0	0
140°	0	0	0	0	0	0	0	0
141°	0	0	0	0	0	0	0	0
142°	0	0	0	0	0	0	0	0
143°	0	0	0	0	0	0	0	0
144°	0	0	0	0	0	0	0	0
145°	0	0	0	0	0	0	0	0
146°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data

$\begin{matrix} C \\ \backslash \\ \gamma \end{matrix}$	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
147°	0	0	0	0	0	0	0	0
148°	0	0	0	0	0	0	0	0
149°	0	0	0	0	0	0	0	0
150°	0	0	0	0	0	0	0	0
151°	0	0	0	0	0	0	0	0
152°	0	0	0	0	0	0	0	0
153°	0	0	0	0	0	0	0	0
154°	0	0	0	0	0	0	0	0
155°	0	0	0	0	0	0	0	0
156°	0	0	0	0	0	0	0	0
157°	0	0	0	0	0	0	0	0
158°	0	0	0	0	0	0	0	0
159°	0	0	0	0	0	0	0	0
160°	0	0	0	0	0	0	0	0
161°	0	0	0	0	0	0	0	0
162°	0	0	0	0	0	0	0	0
163°	0	0	0	0	0	0	0	0
164°	0	0	0	0	0	0	0	0
165°	0	0	0	0	0	0	0	0
166°	0	0	0	0	0	0	0	0
167°	0	0	0	0	0	0	0	0
168°	0	0	0	0	0	0	0	0
169°	0	0	0	0	0	0	0	0
170°	0	0	0	0	0	0	0	0
171°	0	0	0	0	0	0	0	0
172°	0	0	0	0	0	0	0	0
173°	0	0	0	0	0	0	0	0
174°	0	0	0	0	0	0	0	0
175°	0	0	0	0	0	0	0	0
176°	0	0	0	0	0	0	0	0
177°	0	0	0	0	0	0	0	0
178°	0	0	0	0	0	0	0	0
179°	0	0	0	0	0	0	0	0
180°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

$\begin{matrix} \text{C} \\ \backslash \\ \text{Y} \end{matrix}$	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0°	1605	1605	1605	1605	1605	1605	1605	1605
1°	1605	1605	1606	1606	1606	1606	1606	1606
2°	1605	1605	1606	1606	1607	1606	1606	1606
3°	1604	1605	1606	1606	1607	1606	1606	1606
4°	1603	1605	1606	1606	1606	1606	1606	1606
5°	1603	1604	1605	1605	1606	1606	1605	1605
6°	1602	1603	1604	1604	1605	1605	1605	1605
7°	1601	1603	1603	1603	1604	1604	1604	1604
8°	1600	1602	1602	1602	1603	1603	1603	1603
9°	1598	1600	1601	1601	1602	1602	1602	1602
10°	1597	1599	1599	1600	1601	1601	1601	1601
11°	1595	1597	1598	1599	1600	1600	1600	1600
12°	1593	1595	1597	1597	1599	1599	1599	1599
13°	1591	1594	1595	1596	1597	1597	1597	1597
14°	1589	1592	1593	1594	1596	1596	1595	1595
15°	1586	1589	1591	1592	1593	1594	1594	1593
16°	1584	1587	1588	1590	1591	1591	1591	1591
17°	1580	1584	1585	1587	1588	1589	1589	1589
18°	1577	1580	1583	1584	1586	1586	1586	1586
19°	1573	1577	1579	1581	1583	1583	1583	1583
20°	1568	1572	1575	1577	1579	1579	1579	1580
21°	1563	1567	1570	1573	1575	1575	1575	1576
22°	1557	1561	1565	1568	1570	1570	1570	1571
23°	1549	1555	1559	1562	1565	1565	1565	1566
24°	1541	1547	1552	1555	1559	1559	1559	1560
25°	1532	1539	1544	1548	1552	1552	1552	1553
26°	1522	1529	1535	1539	1544	1544	1544	1545
27°	1509	1518	1525	1529	1535	1535	1536	1536
28°	1495	1505	1513	1517	1525	1525	1525	1526
29°	1478	1490	1500	1504	1514	1512	1514	1514
30°	1458	1472	1484	1488	1500	1499	1501	1500
31°	1436	1452	1466	1471	1486	1483	1485	1484
32°	1409	1428	1444	1450	1469	1465	1467	1465
33°	1378	1401	1420	1425	1449	1442	1446	1442
34°	1343	1370	1391	1397	1426	1416	1421	1416
35°	1303	1335	1359	1364	1398	1383	1390	1384
36°	1260	1296	1323	1327	1364	1346	1356	1348
37°	1217	1252	1283	1284	1326	1302	1316	1306
38°	1164	1206	1244	1238	1281	1256	1272	1261
39°	1106	1157	1204	1186	1237	1205	1228	1211
40°	1045	1105	1154	1132	1192	1150	1184	1159
41°	982	1052	1103	1075	1142	1094	1130	1105
42°	917	999	1052	1013	1091	1035	1074	1050
43°	854	948	999	953	1043	974	1018	996
44°	791	899	946	890	996	913	961	945
45°	730	852	894	831	950	853	904	896
46°	672	809	842	771	907	794	849	849
47°	617	766	791	715	866	738	795	806
48°	567	727	741	661	826	684	742	766

Luminous Intensity (cd) Distribution Data (cont.)

$\begin{matrix} \text{C} \\ \backslash \\ \text{Y} \end{matrix}$	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
49°	523	688	692	610	788	633	693	727
50°	484	651	646	570	751	592	646	691
51°	450	617	604	530	713	551	604	656
52°	421	586	564	494	676	511	565	622
53°	395	555	529	462	641	478	530	594
54°	373	525	497	434	606	449	499	565
55°	354	496	468	410	573	423	471	537
56°	337	468	441	388	541	400	446	508
57°	323	443	417	370	510	379	423	481
58°	310	419	394	353	480	362	401	454
59°	300	396	373	337	451	347	379	427
60°	290	373	353	324	422	333	359	401
61°	281	351	333	310	394	320	340	375
62°	273	330	315	297	368	306	322	350
63°	264	309	297	285	343	293	305	326
64°	255	290	281	273	320	279	288	303
65°	246	272	266	262	298	265	273	282
66°	237	255	252	252	278	252	258	263
67°	228	240	239	241	260	240	245	245
68°	219	226	226	232	243	229	233	228
69°	211	213	214	222	228	219	221	213
70°	203	202	203	213	216	210	211	200
71°	196	192	192	204	204	202	201	188
72°	189	182	182	194	193	194	192	177
73°	181	173	173	185	182	186	182	167
74°	172	164	166	175	172	178	173	158
75°	162	154	158	165	160	168	163	149
76°	152	145	151	154	148	158	154	140
77°	141	137	143	144	136	147	145	133
78°	131	129	135	132	125	136	135	126
79°	120	120	127	120	114	123	125	119
80°	109	111	117	108	103	111	115	111
81°	98	102	106	95	92	98	105	102
82°	86	91	94	82	80	86	93	92
83°	73	80	80	70	67	73	81	80
84°	61	68	66	58	55	59	67	68
85°	48	54	52	45	43	47	53	55
86°	35	41	38	33	35	35	40	43
87°	24	27	25	24	25	27	28	30
88°	13	13	17	12	15	14	19	16
89°	3	8	9	8	5	5	10	6
90°	0	0	0	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

Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
98°	0	0	0	0	0	0	0	0
99°	0	0	0	0	0	0	0	0
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	0	0	0	0	0
137°	0	0	0	0	0	0	0	0
138°	0	0	0	0	0	0	0	0
139°	0	0	0	0	0	0	0	0
140°	0	0	0	0	0	0	0	0
141°	0	0	0	0	0	0	0	0
142°	0	0	0	0	0	0	0	0
143°	0	0	0	0	0	0	0	0
144°	0	0	0	0	0	0	0	0
145°	0	0	0	0	0	0	0	0
146°	0	0	0	0	0	0	0	0

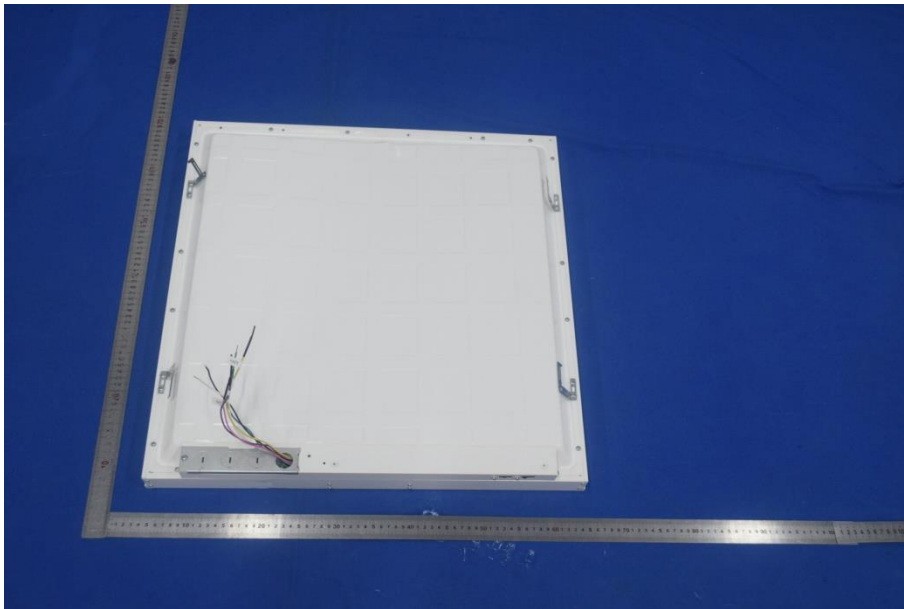
Luminous Intensity (cd) Distribution Data (cont.)

$\begin{matrix} \text{C} \\ \diagdown \\ \gamma \end{matrix}$	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
147°	0	0	0	0	0	0	0	0
148°	0	0	0	0	0	0	0	0
149°	0	0	0	0	0	0	0	0
150°	0	0	0	0	0	0	0	0
151°	0	0	0	0	0	0	0	0
152°	0	0	0	0	0	0	0	0
153°	0	0	0	0	0	0	0	0
154°	0	0	0	0	0	0	0	0
155°	0	0	0	0	0	0	0	0
156°	0	0	0	0	0	0	0	0
157°	0	0	0	0	0	0	0	0
158°	0	0	0	0	0	0	0	0
159°	0	0	0	0	0	0	0	0
160°	0	0	0	0	0	0	0	0
161°	0	0	0	0	0	0	0	0
162°	0	0	0	0	0	0	0	0
163°	0	0	0	0	0	0	0	0
164°	0	0	0	0	0	0	0	0
165°	0	0	0	0	0	0	0	0
166°	0	0	0	0	0	0	0	0
167°	0	0	0	0	0	0	0	0
168°	0	0	0	0	0	0	0	0
169°	0	0	0	0	0	0	0	0
170°	0	0	0	0	0	0	0	0
171°	0	0	0	0	0	0	0	0
172°	0	0	0	0	0	0	0	0
173°	0	0	0	0	0	0	0	0
174°	0	0	0	0	0	0	0	0
175°	0	0	0	0	0	0	0	0
176°	0	0	0	0	0	0	0	0
177°	0	0	0	0	0	0	0	0
178°	0	0	0	0	0	0	0	0
179°	0	0	0	0	0	0	0	0
180°	0	0	0	0	0	0	0	0

Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	38.3	1.04	0-5	38.3	1.04
5-10	114.4	3.11	0-10	152.7	4.15
10-15	188.6	5.13	0-15	341.3	9.28
15-20	259.8	7.06	0-20	601.2	16.34
20-25	325.6	8.86	0-25	926.8	25.20
25-30	381.4	10.37	0-30	1308.2	35.57
30-35	416.9	11.33	0-35	1725.1	46.90
35-40	412.3	11.21	0-40	2137.4	58.11
40-45	360.9	9.81	0-45	2498.3	67.92
45-50	290.5	7.90	0-50	2788.8	75.82
50-55	228.5	6.21	0-55	3017.3	82.03
55-60	183.0	4.97	0-60	3200.3	87.00
60-65	146.7	3.99	0-65	3347.1	90.99
65-70	116.4	3.17	0-70	3463.5	94.16
70-75	92.9	2.53	0-75	3556.4	96.69
75-80	69.7	1.89	0-80	3626.1	98.58
80-85	41.5	1.13	0-85	3667.7	99.71
85-90	10.7	0.29	0-90	3678.3	100.00
90-95	0.0	0.00	0-95	3678.3	100.00
95-100	0.0	0.00	0-100	3678.3	100.00
100-105	0.0	0.00	0-105	3678.3	100.00
105-110	0.0	0.00	0-110	3678.3	100.00
110-115	0.0	0.00	0-115	3678.3	100.00
115-120	0.0	0.00	0-120	3678.3	100.00
120-125	0.0	0.00	0-125	3678.3	100.00
125-130	0.0	0.00	0-130	3678.3	100.00
130-135	0.0	0.00	0-135	3678.3	100.00
135-140	0.0	0.00	0-140	3678.3	100.00
140-145	0.0	0.00	0-145	3678.3	100.00
145-150	0.0	0.00	0-150	3678.3	100.00
150-155	0.0	0.00	0-155	3678.3	100.00
155-160	0.0	0.00	0-160	3678.3	100.00
160-165	0.0	0.00	0-165	3678.3	100.00
165-170	0.0	0.00	0-170	3678.3	100.00
170-175	0.0	0.00	0-175	3678.3	100.00
175-180	0.0	0.00	0-180	3678.3	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. This report includes some test methods are not in NVLAP accreditation scope marked *.
3. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
4. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
5. 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.
6. This report cannot be reproduced except in full, without prior written approval of the Company.
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*****END OF REPORT*****