

ANSI/IES LM-79-19

MEASUREMENT AND TEST REPORT

For

#ULA1L PTY LTD
#2/63 Industrial Dr, Braeside VIC 3195

#Test Model: ECO-BT24W-1200-D



Report Type:	Electrical and Photometric tests including: Luminous Flux, Power Factor, Chromaticity, Luminous Intensity Distribution
Reviewed By:	Hexy He <i>Hexy He</i>
Report Number:	DG5220916-42074E-EE
Test Date:	2022-09-20 to 2022-09-22
Report Date:	2022-10-10
Approved by:	Bill Xiong / EE Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China. Tel: +86-755-33320018 Fax: +86-755-33320008
Test Facility:	Test facility was located at No.12, Pulong East 1 st Road, Tangxia Town, 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.

1. Product Description[#]

General Information:

One test sample was in good condition and received on 2022-09-16, and used for testing. All tests and evaluations were performed at the lowest CCT.

Model Tested: ECO-BT24W-1200-D
Manufacturer: ULA1L PTY LTD
Brand Name: 
Product Designation: LED Batten Light
Burning Time Before Test: 0hour(For New Products)
Driver Brand: 
Driver Model: MC24W MS CCT

Rated Values:

Rated Voltage/Frequency: 220-240V 50/60Hz
Rated Power: 24W
Nominal CCT: 3000/4000/5700K
Nominal Lumen Output: 3360 lm

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 integrating sphere	SENSING	1.5m	NA	2022-06-07	2023-06-06
Digital power meter	EVERFINE	PF9811	G135717CN1361159	2022-01-05	2023-01-04
High-precision rapid spectral radiometer	EVERFINE	HAAS-2000	N/A	2022-06-07	2023-06-06
Precision frequency power supply	ALL Power	APW-105N	970663	2022-01-06	2023-01-05
Standard Light Source	EVERFINE	D204	N/A	2021-10-15	2022-10-14
thermometer	SENSING	NA	NA	2022-01-11	2023-01-10
Programmable Precision DC Power Supply	EVERFINE	WY5015	11060010	2022-01-05	2023-01-04
AC POWER SUPPLY	EVERFINE	VPS1030 PWM	1012017	2022-01-06	2023-01-05
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	2022-01-06	2023-01-05
Digital power meter	YOKOGAWA	WT-210	91j926132	2022-01-06	2023-01-05

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	2021-10-26	2022-10-25
wireless remote thermohygrometer	N/A	433MHz	N/A	2022-01-10	2023-01-09
Standard Light Source	EVERFINE	D908	1012003	2021-10-15	2022-10-14

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 $U=21\text{K}$ ($K=2$), 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 $U=0.17\%$ of rdg, Power $U=0.48\%$ ($K=2$), 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]

The Stabilization time: **30 minutes**

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

Test orientation: **Downward**

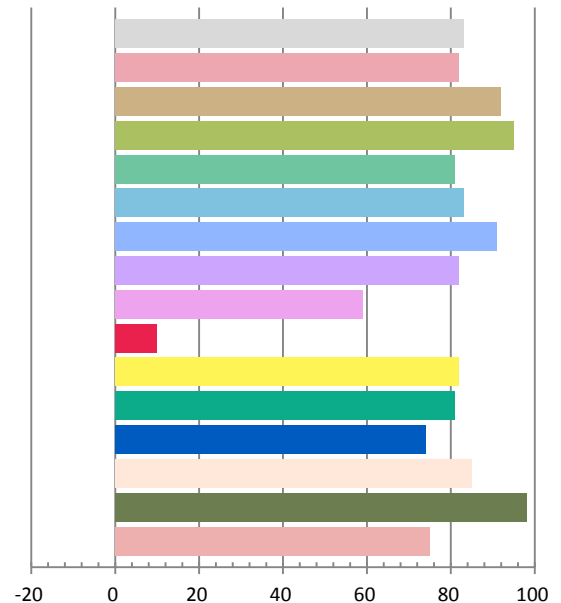
Photometric and Electrical Measurement Result

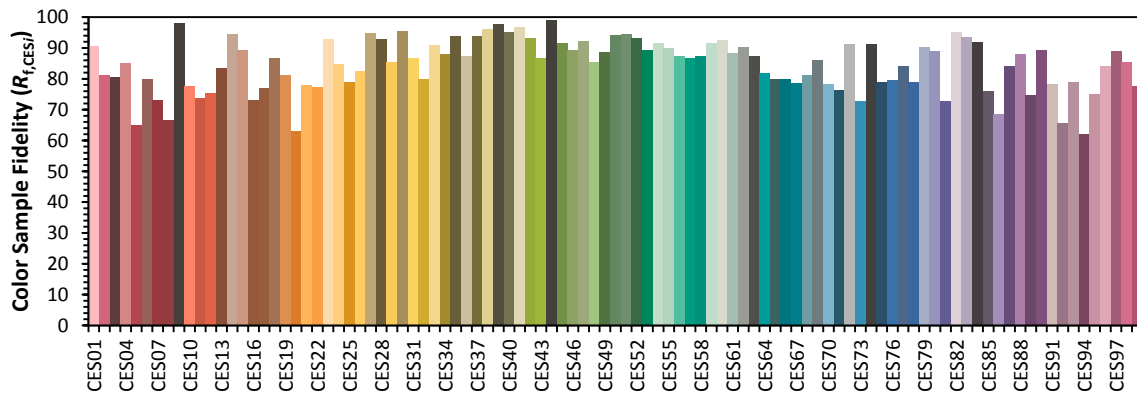
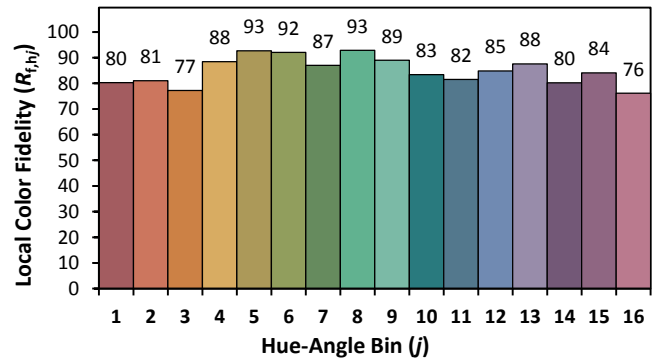
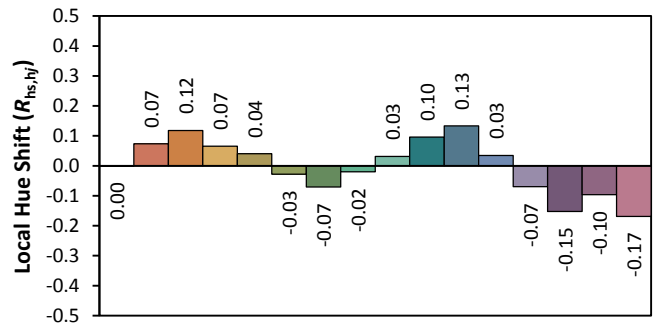
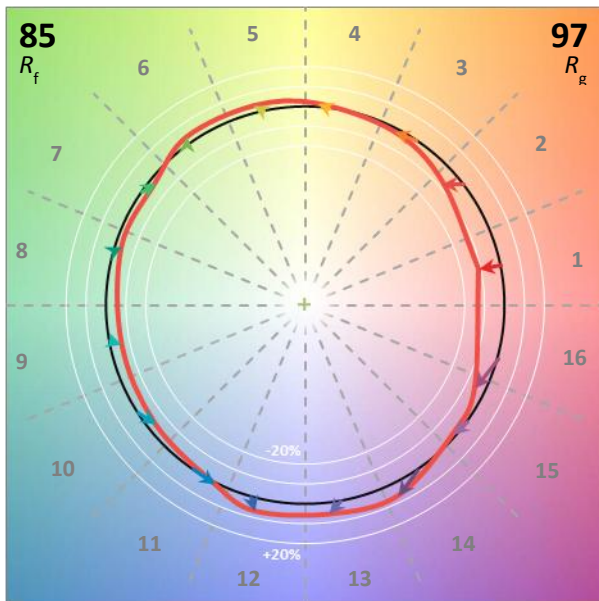
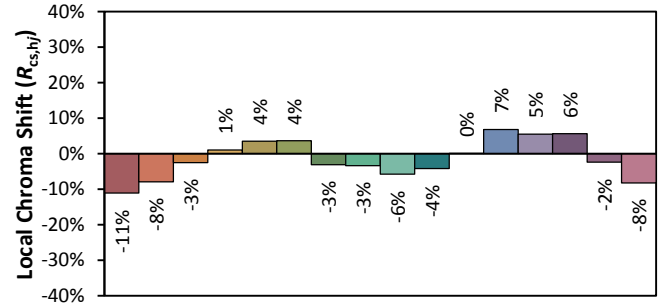
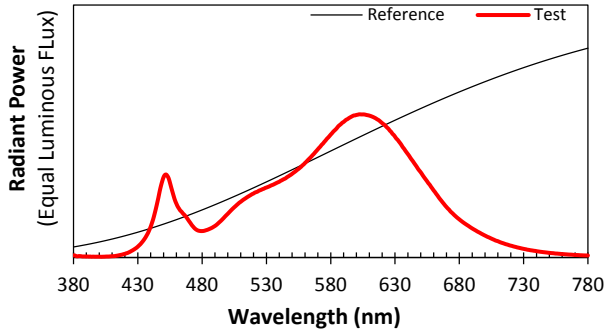
Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
230.1	50	0.1072	23.95	0.971	3378.8	141.05

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
10.399	2953	-0.00232	0.4369	0.3983	0.2531	0.5191

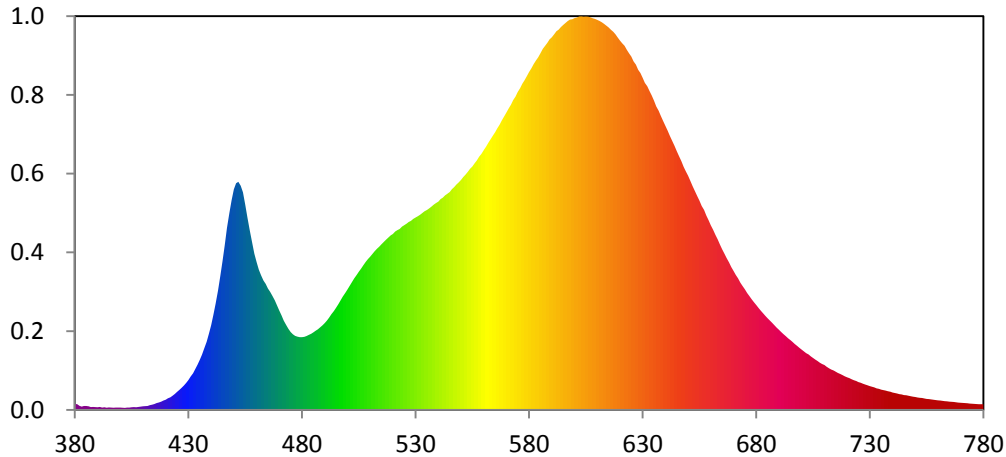
Color Rendering Index

Ra			
83.1			
R1	R2	R3	R4
82	92	95	81
R5	R6	R7	R8
83	91	82	59
R9	R10	R11	R12
10	82	81	74
R13	R14	R15	
85	98	75	





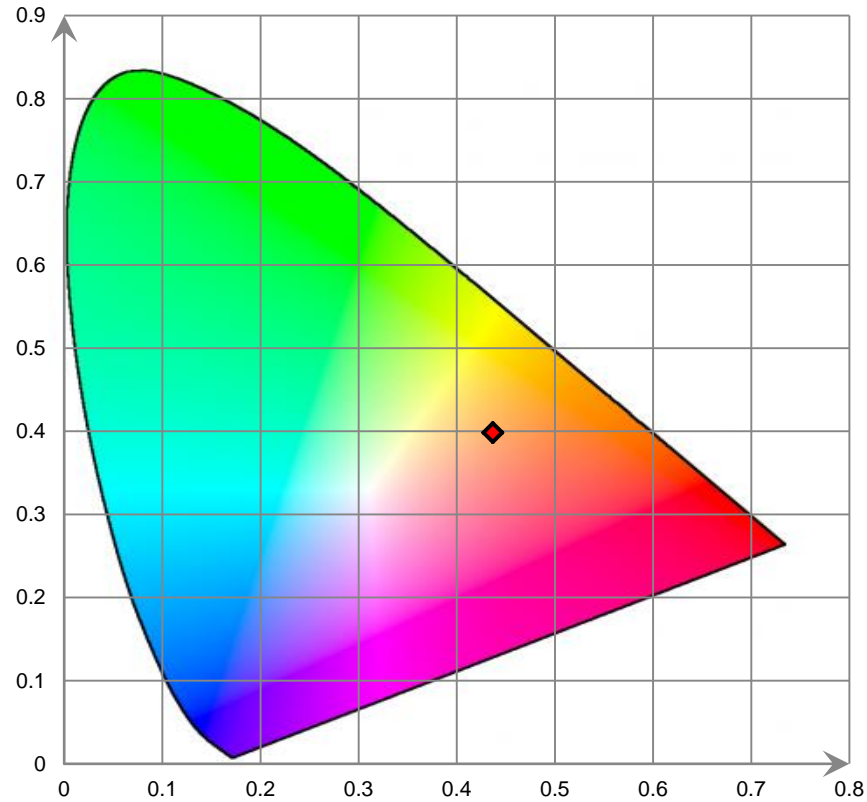
Relative Spectral Power Distribution



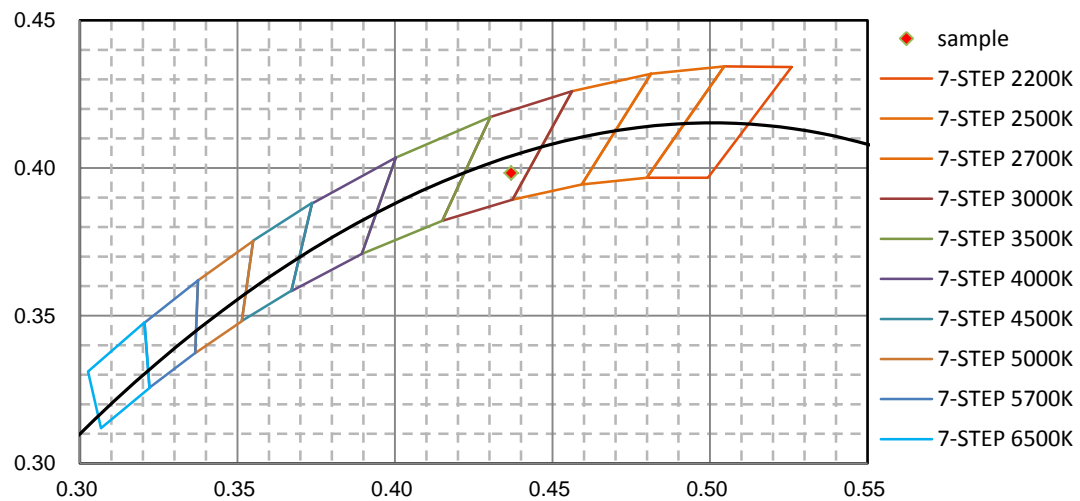
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	1.064E+00	421	2.079E+00	462	2.402E+01	503	2.344E+01	544	3.852E+01
381	1.025E+00	422	2.241E+00	463	2.306E+01	504	2.405E+01	545	3.885E+01
382	7.272E-01	423	2.539E+00	464	2.245E+01	505	2.463E+01	546	3.936E+01
383	5.864E-01	424	2.852E+00	465	2.165E+01	506	2.518E+01	547	3.973E+01
384	7.023E-01	425	3.217E+00	466	2.103E+01	507	2.577E+01	548	4.017E+01
385	7.123E-01	426	3.550E+00	467	2.032E+01	508	2.633E+01	549	4.055E+01
386	6.396E-01	427	3.945E+00	468	1.954E+01	509	2.689E+01	550	4.101E+01
387	5.182E-01	428	4.368E+00	469	1.861E+01	510	2.731E+01	551	4.151E+01
388	5.357E-01	429	4.813E+00	470	1.770E+01	511	2.781E+01	552	4.195E+01
389	5.205E-01	430	5.337E+00	471	1.684E+01	512	2.829E+01	553	4.244E+01
390	4.736E-01	431	5.949E+00	472	1.590E+01	513	2.870E+01	554	4.297E+01
391	5.243E-01	432	6.528E+00	473	1.515E+01	514	2.912E+01	555	4.340E+01
392	4.343E-01	433	7.287E+00	474	1.444E+01	515	2.955E+01	556	4.396E+01
393	4.908E-01	434	8.054E+00	475	1.389E+01	516	2.995E+01	557	4.448E+01
394	3.906E-01	435	8.928E+00	476	1.348E+01	517	3.033E+01	558	4.514E+01
395	4.476E-01	436	9.864E+00	477	1.319E+01	518	3.071E+01	559	4.563E+01
396	4.235E-01	437	1.098E+01	478	1.306E+01	519	3.110E+01	560	4.632E+01
397	4.010E-01	438	1.214E+01	479	1.297E+01	520	3.137E+01	561	4.690E+01
398	4.137E-01	439	1.356E+01	480	1.298E+01	521	3.180E+01	562	4.758E+01
399	4.184E-01	440	1.509E+01	481	1.302E+01	522	3.204E+01	563	4.823E+01
400	4.154E-01	441	1.692E+01	482	1.317E+01	523	3.226E+01	564	4.884E+01
401	3.883E-01	442	1.893E+01	483	1.338E+01	524	3.267E+01	565	4.951E+01
402	3.622E-01	443	2.128E+01	484	1.356E+01	525	3.294E+01	566	5.021E+01
403	4.114E-01	444	2.379E+01	485	1.381E+01	526	3.319E+01	567	5.085E+01
404	4.128E-01	445	2.649E+01	486	1.410E+01	527	3.350E+01	568	5.161E+01
405	4.709E-01	446	2.935E+01	487	1.437E+01	528	3.371E+01	569	5.231E+01
406	5.034E-01	447	3.244E+01	488	1.470E+01	529	3.406E+01	570	5.304E+01
407	4.922E-01	448	3.511E+01	489	1.509E+01	530	3.429E+01	571	5.376E+01
408	5.426E-01	449	3.738E+01	490	1.548E+01	531	3.453E+01	572	5.442E+01
409	5.989E-01	450	3.932E+01	491	1.593E+01	532	3.478E+01	573	5.525E+01
410	6.440E-01	451	4.041E+01	492	1.648E+01	533	3.510E+01	574	5.584E+01
411	6.737E-01	452	4.066E+01	493	1.706E+01	534	3.541E+01	575	5.665E+01
412	7.094E-01	453	3.996E+01	494	1.763E+01	535	3.563E+01	576	5.733E+01
413	8.332E-01	454	3.878E+01	495	1.822E+01	536	3.593E+01	577	5.814E+01
414	9.231E-01	455	3.662E+01	496	1.886E+01	537	3.625E+01	578	5.878E+01
415	1.063E+00	456	3.428E+01	497	1.952E+01	538	3.658E+01	579	5.948E+01
416	1.208E+00	457	3.206E+01	498	2.021E+01	539	3.687E+01	580	6.023E+01
417	1.329E+00	458	2.989E+01	499	2.085E+01	540	3.714E+01	581	6.090E+01
418	1.473E+00	459	2.787E+01	500	2.146E+01	541	3.757E+01	582	6.166E+01
419	1.670E+00	460	2.638E+01	501	2.213E+01	542	3.785E+01	583	6.227E+01
420	1.830E+00	461	2.501E+01	502	2.278E+01	543	3.824E+01	584	6.285E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	6.358E+01	626	6.213E+01	667	2.704E+01	708	8.393E+00	749	2.369E+00
586	6.437E+01	627	6.154E+01	668	2.628E+01	709	8.174E+00	750	2.303E+00
587	6.490E+01	628	6.062E+01	669	2.548E+01	710	8.000E+00	751	2.221E+00
588	6.542E+01	629	6.005E+01	670	2.476E+01	711	7.701E+00	752	2.171E+00
589	6.603E+01	630	5.920E+01	671	2.406E+01	712	7.447E+00	753	2.124E+00
590	6.641E+01	631	5.829E+01	672	2.347E+01	713	7.220E+00	754	2.039E+00
591	6.696E+01	632	5.769E+01	673	2.268E+01	714	7.023E+00	755	1.953E+00
592	6.749E+01	633	5.684E+01	674	2.206E+01	715	6.806E+00	756	1.943E+00
593	6.779E+01	634	5.604E+01	675	2.149E+01	716	6.571E+00	757	1.872E+00
594	6.824E+01	635	5.511E+01	676	2.085E+01	717	6.409E+00	758	1.824E+00
595	6.862E+01	636	5.409E+01	677	2.029E+01	718	6.217E+00	759	1.755E+00
596	6.897E+01	637	5.332E+01	678	1.971E+01	719	5.979E+00	760	1.699E+00
597	6.931E+01	638	5.238E+01	679	1.919E+01	720	5.828E+00	761	1.670E+00
598	6.958E+01	639	5.149E+01	680	1.869E+01	721	5.681E+00	762	1.612E+00
599	6.965E+01	640	5.065E+01	681	1.818E+01	722	5.469E+00	763	1.569E+00
600	6.985E+01	641	4.979E+01	682	1.770E+01	723	5.307E+00	764	1.522E+00
601	6.996E+01	642	4.880E+01	683	1.721E+01	724	5.166E+00	765	1.470E+00
602	7.013E+01	643	4.792E+01	684	1.677E+01	725	4.967E+00	766	1.441E+00
603	7.014E+01	644	4.707E+01	685	1.635E+01	726	4.837E+00	767	1.428E+00
604	7.009E+01	645	4.614E+01	686	1.593E+01	727	4.684E+00	768	1.367E+00
605	7.011E+01	646	4.526E+01	687	1.553E+01	728	4.531E+00	769	1.302E+00
606	7.009E+01	647	4.434E+01	688	1.509E+01	729	4.385E+00	770	1.268E+00
607	6.997E+01	648	4.333E+01	689	1.466E+01	730	4.253E+00	771	1.240E+00
608	6.980E+01	649	4.253E+01	690	1.427E+01	731	4.126E+00	772	1.223E+00
609	6.969E+01	650	4.175E+01	691	1.389E+01	732	4.008E+00	773	1.186E+00
610	6.953E+01	651	4.083E+01	692	1.352E+01	733	3.831E+00	774	1.120E+00
611	6.933E+01	652	3.985E+01	693	1.316E+01	734	3.763E+00	775	1.114E+00
612	6.909E+01	653	3.898E+01	694	1.276E+01	735	3.617E+00	776	1.073E+00
613	6.882E+01	654	3.813E+01	695	1.244E+01	736	3.525E+00	777	1.047E+00
614	6.851E+01	655	3.729E+01	696	1.211E+01	737	3.435E+00	778	1.031E+00
615	6.819E+01	656	3.637E+01	697	1.173E+01	738	3.322E+00	779	1.024E+00
616	6.775E+01	657	3.564E+01	698	1.140E+01	739	3.251E+00	780	1.026E+00
617	6.741E+01	658	3.466E+01	699	1.107E+01	740	3.117E+00		
618	6.694E+01	659	3.382E+01	700	1.075E+01	741	3.012E+00		
619	6.638E+01	660	3.290E+01	701	1.043E+01	742	2.931E+00		
620	6.585E+01	661	3.212E+01	702	1.011E+01	743	2.828E+00		
621	6.535E+01	662	3.120E+01	703	9.875E+00	744	2.759E+00		
622	6.489E+01	663	3.040E+01	704	9.557E+00	745	2.662E+00		
623	6.420E+01	664	2.947E+01	705	9.267E+00	746	2.605E+00		
624	6.357E+01	665	2.863E+01	706	8.970E+00	747	2.523E+00		
625	6.300E+01	666	2.785E+01	707	8.712E+00	748	2.453E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

The Stabilization time: **30 minutes**

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

Test orientation: **Downward**

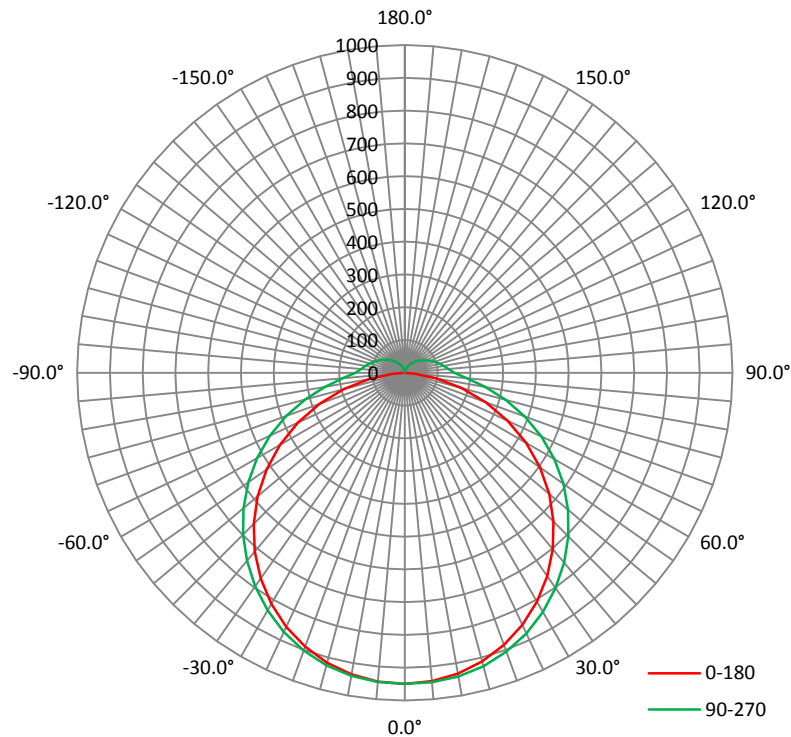
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
230.1	50	0.1073	23.98	0.9711

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
3382.74	141.06	949.8	1.26	1.32

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	114.6	122.7	127.4	122.9	121.9
Field Angle (10% I _{max}):	161.1	183.9	223.1	185.8	188.5

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0°	949	949	949	949	949	949	949	949
1°	949	949	950	949	949	949	949	950
2°	949	949	949	949	948	949	949	949
3°	948	948	949	949	948	948	948	948
4°	947	947	948	948	947	948	947	947
5°	946	946	947	947	947	947	946	946
6°	944	945	946	946	945	946	945	944
7°	942	942	944	945	945	944	944	942
8°	940	941	942	943	943	943	941	940
9°	938	938	941	942	941	941	939	938
10°	935	935	938	939	939	939	937	935
11°	932	932	936	937	936	937	934	932
12°	928	929	932	934	934	933	931	928
13°	924	926	930	931	931	930	928	925
14°	920	922	926	928	928	927	924	921
15°	916	918	922	924	924	924	920	916
16°	911	914	918	921	921	920	916	912
17°	906	909	914	916	916	915	912	907
18°	901	904	909	912	912	911	907	902
19°	895	898	904	907	907	906	902	897
20°	889	893	899	902	902	901	897	891
21°	883	887	894	897	897	896	891	885
22°	877	881	888	891	892	890	885	879
23°	869	874	881	885	885	884	879	872
24°	863	868	875	879	880	878	873	865
25°	856	860	869	873	873	871	866	858
26°	848	853	862	866	866	865	859	851
27°	840	845	854	859	859	858	852	843
28°	831	838	847	852	853	850	844	835
29°	823	830	840	844	845	843	837	827
30°	814	821	831	837	837	835	828	819
31°	805	813	823	829	830	827	820	810
32°	796	804	815	821	822	819	812	801
33°	786	794	806	812	813	811	803	792
34°	776	785	797	804	805	802	794	782
35°	766	776	788	795	796	793	785	772
36°	756	766	779	786	787	784	775	763
37°	745	755	769	777	778	775	766	753
38°	734	746	759	767	768	765	756	742
39°	723	734	749	757	759	755	746	731
40°	712	724	739	748	749	745	736	720
41°	701	713	729	737	739	735	725	709
42°	689	701	718	727	729	725	715	698
43°	677	690	707	717	719	715	704	687
44°	664	678	696	706	708	704	692	675
45°	652	667	685	695	698	693	681	663
46°	639	654	673	685	687	682	670	651
47°	626	642	662	673	676	672	658	638
48°	613	629	650	662	665	660	646	626

Luminous Intensity (cd) Distribution Data

$\begin{matrix} \text{C} \\ \backslash \\ \gamma \end{matrix}$	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
49°	600	616	638	650	653	649	634	613
50°	586	604	626	639	643	637	622	600
51°	573	591	613	627	631	625	610	587
52°	558	577	601	615	619	613	597	573
53°	544	564	588	603	607	601	584	560
54°	530	550	575	591	595	589	572	546
55°	515	536	562	579	583	576	559	532
56°	501	522	549	566	571	564	546	518
57°	486	507	536	553	558	551	532	504
58°	470	493	522	541	546	538	518	489
59°	455	479	509	528	533	526	505	475
60°	440	464	495	515	520	513	491	460
61°	424	449	481	501	507	499	477	445
62°	408	434	467	488	494	486	464	430
63°	393	419	453	474	481	473	449	415
64°	376	404	439	461	467	459	435	400
65°	360	389	424	447	454	445	421	384
66°	344	373	410	433	440	432	406	369
67°	327	357	395	419	427	417	392	353
68°	310	342	381	405	413	403	377	337
69°	294	326	366	391	399	389	363	322
70°	277	310	351	377	385	375	348	306
71°	260	294	336	363	371	361	333	290
72°	243	278	321	349	357	347	318	274
73°	226	262	307	334	343	333	303	258
74°	209	246	291	320	329	319	288	242
75°	192	230	277	306	315	305	274	227
76°	175	215	262	292	301	290	259	211
77°	158	199	247	278	288	276	244	195
78°	142	184	233	264	274	263	230	180
79°	126	168	218	250	261	249	216	165
80°	110	153	204	237	248	236	202	150
81°	95	139	190	224	235	223	188	136
82°	80	125	177	211	222	211	175	122
83°	67	111	165	199	211	199	163	108
84°	53	98	152	188	199	187	151	96
85°	40	86	141	177	189	177	140	84
86°	29	75	131	167	179	167	130	74
87°	19	67	122	158	171	159	122	67
88°	11	59	114	151	163	151	114	59
89°	8	51	107	144	156	144	108	52
90°	4	46	102	138	151	139	103	48
91°	1	43	98	133	146	134	99	46
92°	1	42	95	130	142	131	97	44
93°	1	40	92	127	139	128	95	43
94°	1	39	90	124	136	125	93	42
95°	0	38	89	122	134	123	91	40
96°	0	37	87	120	131	121	89	39
97°	0	35	85	117	129	119	87	38

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
98°	0	34	83	115	126	116	85	37
99°	0	33	81	113	124	114	83	36
100°	0	33	80	111	122	112	82	35
101°	0	32	78	108	119	110	80	34
102°	0	31	76	106	117	108	78	33
103°	0	30	74	104	115	105	76	32
104°	0	29	73	102	112	103	75	32
105°	0	28	71	100	110	101	73	31
106°	0	28	69	98	108	99	71	30
107°	0	27	68	96	106	97	70	29
108°	0	26	66	94	103	95	68	29
109°	0	26	64	92	101	93	66	28
110°	0	25	63	90	99	91	65	27
111°	0	24	62	88	97	89	63	27
112°	0	24	60	86	95	87	62	26
113°	0	23	59	84	93	85	60	25
114°	0	23	57	82	91	83	59	25
115°	0	22	56	80	89	81	58	24
116°	0	21	55	78	87	79	56	23
117°	0	21	53	77	85	77	55	23
118°	0	20	52	75	83	76	54	22
119°	0	20	51	73	81	74	52	22
120°	0	19	49	71	79	72	51	21
121°	0	19	48	69	77	70	50	21
122°	1	18	47	67	75	68	48	20
123°	1	18	46	66	73	66	47	20
124°	1	17	44	64	71	65	46	19
125°	1	17	43	62	69	63	45	19
126°	1	16	42	61	68	61	43	18
127°	1	16	41	59	66	60	42	18
128°	1	16	40	58	64	58	41	17
129°	1	15	39	56	62	57	40	17
130°	1	15	38	54	61	55	39	16
131°	1	14	37	53	59	54	38	16
132°	1	14	36	51	57	52	37	15
133°	1	13	34	50	56	51	36	15
134°	1	13	33	48	54	49	35	14
135°	1	13	32	47	52	48	33	14
136°	1	12	31	46	51	46	32	13
137°	1	12	30	44	49	45	31	13
138°	1	11	29	43	48	43	30	13
139°	1	11	28	41	46	42	29	12
140°	1	11	27	40	45	41	28	12
141°	1	10	27	39	43	39	28	11
142°	1	10	26	37	42	38	27	10
143°	1	10	25	36	40	37	26	10
144°	1	9	24	35	39	35	25	10
145°	1	9	23	34	38	34	24	10
146°	1	9	22	32	36	33	23	9

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°	1	8	21	31	35	31	22	9
148°	1	8	20	30	33	30	21	9
149°	2	8	19	29	32	29	20	8
150°	2	7	19	27	31	28	19	8
151°	2	7	18	26	29	27	18	8
152°	2	7	17	25	28	25	18	7
153°	2	6	16	24	27	24	17	7
154°	2	6	15	23	25	23	16	6
155°	2	6	14	21	24	22	15	6
156°	2	5	14	20	23	21	14	6
157°	2	5	13	19	21	19	13	5
158°	2	5	12	18	20	18	13	5
159°	2	5	11	17	19	17	12	5
160°	2	4	11	16	18	16	11	4
161°	2	4	10	15	17	15	10	4
162°	2	4	9	14	15	14	9	4
163°	2	4	8	13	14	13	8	4
164°	2	3	8	12	13	12	7	3
165°	2	3	7	11	12	11	6	3
166°	2	3	6	10	11	10	6	3
167°	2	3	6	9	10	9	5	3
168°	2	3	5	8	9	8	5	3
169°	2	2	5	7	8	7	4	2
170°	2	2	4	6	7	6	4	2
171°	2	2	4	5	6	5	3	2
172°	2	2	3	4	5	4	3	2
173°	2	2	3	4	4	3	3	2
174°	2	2	2	3	3	3	2	2
175°	2	2	2	3	3	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	1	1	1	2	2

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°
0°	949	949	949	949	949	949	949	949
1°	949	949	950	950	949	950	950	950
2°	948	948	949	949	949	950	949	949
3°	947	947	949	949	949	949	949	948
4°	946	946	948	949	948	949	948	948
5°	944	945	947	948	948	948	948	946
6°	943	943	946	947	947	947	946	945
7°	940	941	944	946	946	946	945	943
8°	938	940	942	944	945	945	943	941
9°	935	937	940	942	943	943	942	939
10°	932	934	937	940	941	941	939	936
11°	929	931	935	938	939	939	936	933
12°	925	928	932	935	936	936	934	930
13°	921	924	929	933	934	933	930	926
14°	916	920	925	929	931	930	927	923
15°	912	916	921	926	927	927	923	918
16°	907	911	917	922	924	923	919	914
17°	902	906	913	918	919	919	915	909
18°	896	901	908	914	915	915	910	904
19°	890	895	903	909	911	910	906	899
20°	884	889	898	904	906	905	900	893
21°	878	884	892	898	901	900	895	887
22°	871	878	887	893	896	895	889	881
23°	864	871	881	887	890	889	883	875
24°	857	864	874	881	884	883	877	868
25°	849	857	868	875	878	877	870	861
26°	841	849	861	868	871	871	864	853
27°	833	841	853	861	865	863	857	846
28°	825	834	846	854	857	856	849	838
29°	816	826	839	847	850	849	842	830
30°	807	817	830	840	843	842	834	821
31°	798	808	822	832	836	834	826	813
32°	788	799	814	824	827	826	818	804
33°	778	790	805	815	819	817	809	795
34°	768	780	796	807	811	809	800	786
35°	758	771	787	798	802	800	791	776
36°	747	760	778	789	793	792	782	766
37°	737	751	768	780	784	782	772	756
38°	725	740	758	771	776	773	762	746
39°	714	729	748	761	766	763	752	735
40°	703	718	738	751	756	754	743	724
41°	691	707	727	741	747	744	732	713
42°	679	696	717	731	737	734	721	702
43°	666	684	706	721	727	723	711	691
44°	655	672	695	710	716	713	700	679
45°	642	661	684	699	705	702	689	667
46°	629	648	672	689	695	692	677	655
47°	616	636	661	677	684	680	666	643
48°	602	623	649	666	673	669	654	630

Luminous Intensity (cd) Distribution Data (cont.)

$\begin{matrix} C \\ \backslash \\ \gamma \end{matrix}$	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
49°	589	610	637	655	662	658	642	617
50°	575	597	625	643	650	646	630	604
51°	561	584	612	631	639	634	617	591
52°	547	570	599	619	627	622	605	578
53°	533	557	587	607	615	610	592	563
54°	518	543	574	595	603	598	579	550
55°	504	529	561	583	591	585	567	536
56°	489	515	547	570	579	573	553	522
57°	473	500	534	557	566	560	540	507
58°	458	486	521	544	553	548	526	493
59°	443	471	507	531	540	534	513	479
60°	428	456	493	518	527	521	499	464
61°	411	441	479	505	514	508	485	449
62°	396	426	465	491	501	494	471	434
63°	379	411	451	477	487	481	457	419
64°	363	396	436	464	474	467	442	404
65°	347	380	421	450	460	453	428	388
66°	330	364	407	436	446	439	413	372
67°	313	349	392	421	432	425	398	357
68°	297	333	377	407	418	410	384	341
69°	280	317	362	393	404	396	369	326
70°	263	301	347	379	390	382	354	309
71°	246	285	332	364	376	367	339	293
72°	229	269	317	349	361	353	324	277
73°	212	253	302	335	347	338	309	262
74°	195	237	287	321	333	324	294	246
75°	178	221	272	306	318	309	278	230
76°	161	205	257	292	304	295	264	214
77°	145	190	242	277	290	281	249	199
78°	128	174	228	263	277	267	234	183
79°	112	159	213	250	263	253	220	168
80°	97	143	199	236	249	239	206	153
81°	82	129	186	223	237	226	192	138
82°	67	115	173	210	224	213	179	124
83°	54	102	160	198	212	201	167	110
84°	41	90	148	187	201	190	155	98
85°	30	78	137	176	190	179	142	86
86°	22	69	127	168	181	170	132	76
87°	14	60	119	159	172	161	123	67
88°	6	53	112	150	166	152	116	59
89°	2	48	106	144	159	146	109	53
90°	0	45	101	139	152	141	105	49
91°	0	43	98	134	147	136	101	46
92°	0	41	95	131	143	132	98	44
93°	0	40	93	128	140	129	95	43
94°	0	39	91	125	137	126	93	41
95°	0	37	89	122	134	123	91	40
96°	0	36	87	120	131	121	89	39
97°	0	35	85	117	129	118	87	38

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°
98°	0	34	83	115	126	116	85	36
99°	0	33	81	113	124	114	83	35
100°	0	32	79	110	121	111	81	34
101°	0	31	77	108	119	109	79	33
102°	0	30	75	106	116	107	77	32
103°	0	29	74	103	114	104	75	31
104°	0	29	72	101	111	102	74	30
105°	0	28	70	99	109	100	72	30
106°	0	27	69	97	107	98	70	29
107°	0	26	67	95	104	95	68	28
108°	0	26	65	92	102	93	67	27
109°	0	25	64	90	100	91	65	26
110°	0	24	62	88	97	89	64	26
111°	0	24	61	86	95	87	62	25
112°	0	23	59	84	93	85	60	24
113°	0	22	58	82	91	83	59	24
114°	0	22	56	80	89	81	57	23
115°	0	21	55	78	87	79	56	22
116°	0	21	53	76	85	77	55	22
117°	0	20	52	75	83	75	53	21
118°	0	19	51	73	81	73	52	21
119°	0	19	49	71	79	72	50	20
120°	0	18	48	69	77	70	49	19
121°	0	18	47	67	75	68	48	19
122°	0	17	45	66	73	66	46	18
123°	0	17	44	64	71	64	45	18
124°	0	16	43	62	69	63	44	17
125°	0	16	42	61	67	61	43	17
126°	0	15	41	59	65	59	41	16
127°	0	15	39	57	64	58	40	16
128°	0	14	38	56	62	56	39	15
129°	0	14	37	54	60	54	38	15
130°	1	13	36	52	58	53	37	14
131°	1	13	35	51	57	51	36	14
132°	1	12	34	49	55	50	34	13
133°	1	12	33	48	53	48	33	13
134°	1	11	31	46	52	47	32	12
135°	1	11	30	45	50	45	31	12
136°	1	10	29	43	48	44	30	12
137°	1	10	28	42	47	42	29	11
138°	1	9	27	40	45	41	28	11
139°	1	9	26	39	44	40	27	10
140°	1	8	25	37	42	38	26	10
141°	1	8	24	36	41	37	26	10
142°	1	7	23	34	39	36	25	10
143°	1	7	21	33	38	34	24	9
144°	1	6	20	31	36	33	23	9
145°	1	6	19	30	35	32	22	9
146°	1	5	18	29	33	31	22	9

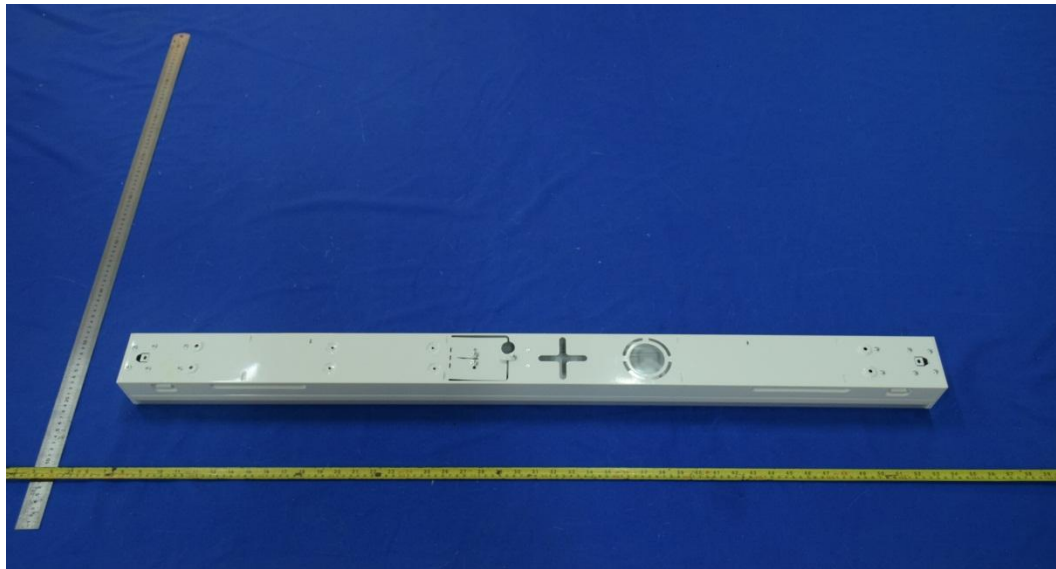
Luminous Intensity (cd) Distribution Data (cont.)

$\begin{matrix} C \\ \backslash \\ \gamma \end{matrix}$	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
147°	1	5	17	27	32	29	21	9
148°	1	4	16	26	30	28	20	8
149°	1	4	15	24	29	27	19	8
150°	1	3	14	23	27	26	19	8
151°	1	3	13	21	26	25	18	8
152°	1	2	11	20	25	24	17	8
153°	1	2	10	19	23	22	17	8
154°	1	2	9	17	22	21	16	7
155°	1	2	8	16	20	20	15	7
156°	1	1	7	15	19	19	14	7
157°	1	1	6	14	18	18	14	7
158°	1	1	5	12	17	17	13	7
159°	1	1	5	11	15	16	12	6
160°	1	1	4	10	14	15	11	6
161°	1	1	4	9	13	13	11	6
162°	1	1	3	8	12	12	10	5
163°	1	1	3	7	10	11	9	5
164°	1	1	2	6	9	10	8	5
165°	1	1	2	5	8	9	7	4
166°	1	1	2	4	7	8	7	4
167°	1	1	2	4	6	7	6	3
168°	1	1	2	3	6	6	5	3
169°	1	1	1	3	5	5	5	3
170°	1	1	1	2	4	4	4	2
171°	1	1	1	2	3	4	3	2
172°	1	1	1	2	3	3	3	2
173°	1	1	1	2	2	3	2	2
174°	1	1	1	2	2	2	2	2
175°	1	1	1	1	2	2	2	1
176°	1	1	1	1	2	2	2	1
177°	2	2	2	1	1	2	1	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)	%	Deg	Flux (lm)	%
0-5	22.7	0.67	0-5	22.7	0.67
5-10	67.4	1.99	0-10	90.1	2.66
10-15	110.2	3.26	0-15	200.3	5.92
15-20	149.8	4.43	0-20	350.2	10.35
20-25	185.0	5.47	0-25	535.1	15.82
25-30	214.5	6.34	0-30	749.6	22.16
30-35	237.6	7.02	0-35	987.2	29.18
35-40	253.5	7.50	0-40	1240.7	36.68
40-45	262.0	7.74	0-45	1502.7	44.42
45-50	262.8	7.77	0-50	1765.5	52.19
50-55	255.8	7.56	0-55	2021.3	59.75
55-60	241.3	7.14	0-60	2262.6	66.89
60-65	219.6	6.49	0-65	2482.2	73.38
65-70	191.5	5.66	0-70	2673.7	79.04
70-75	158.2	4.68	0-75	2832.0	83.72
75-80	121.8	3.60	0-80	2953.8	87.32
80-85	86.2	2.55	0-85	3040.0	89.87
85-90	58.7	1.73	0-90	3098.7	91.60
90-95	46.3	1.37	0-95	3145.0	92.97
95-100	41.0	1.21	0-100	3186.0	94.18
100-105	36.2	1.07	0-105	3222.2	95.25
105-110	31.6	0.94	0-110	3253.7	96.19
110-115	27.2	0.80	0-115	3281.0	96.99
115-120	23.1	0.68	0-120	3304.1	97.67
120-125	19.3	0.58	0-125	3323.4	98.25
125-130	15.9	0.47	0-130	3339.3	98.72
130-135	12.7	0.37	0-135	3352.0	99.09
135-140	9.9	0.29	0-140	3361.9	99.38
140-145	7.5	0.23	0-145	3369.4	99.61
145-150	5.4	0.16	0-150	3374.8	99.77
150-155	3.7	0.10	0-155	3378.5	99.87
155-160	2.3	0.07	0-160	3380.7	99.94
160-165	1.2	0.04	0-165	3382.0	99.98
165-170	0.5	0.01	0-170	3382.5	99.99
170-175	0.2	0.01	0-175	3382.7	100.00
175-180	0.0	0.00	0-180	3382.7	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. 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.
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