

Test Report Of ANSI/IES LM-79-19

APPROVED METHOD FOR OPTICAL AND ELECTRICAL MEASUREMENTS OF SOLID-STATE LIGHTING PRODUCTS

Report Number..... : N02A23040544L00101

Client..... : ROYALUX EXPORTS

Address..... : 150-B, NOIDA SPECIAL ECONOMIC ZONE, NOIDA, GAUTAM BUDDHA
NAGAR, UTTAR PRADESH, 201305, INDIA

Test Model..... : 5804AP10WB1358F, 5804AP10WB1658F

Brand Name..... : 

Testing Laboratory... : Guangdong Meide Testing Technology Co., Ltd.

Address..... : 1st floor, B Area, Jinbaisheng Industrial Park, Headquarters 2 Road, Songshan
Lake Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr.,
China.

Testing location..... : As above

Date of receipt..... : Apr. 20, 2023

Date of test : Aug. 08, 2023

Date of report..... : Aug. 09, 2023

Tested by:



Jarvis Zhang/ Test Engineer

Checked by:



Sandy Chen/ Project Engineer

Approved by:



Jessie Li/ Technical Manager



Note 1: The test data was only valid for the test sample(s). 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 Guangdong Meide Testing Technology Co., Ltd. This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Note 2: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Note 3: This report contains data that are not covered by the NVLAP accreditation. It is marked * in the title.

1. Product Description for Equipment under Test(EUT)

Representative (Tested) Model:	5804AP10WB1358F, 5804AP10WB1658F
Model No.:	5804AP10WB1358F, 5804AP10WB1408F, 5804AP10WB1508F, 5804AP10WB1658F (The models are same except CCT.)
Manufacturer:	ROYALUX EXPORTS PRIVATE LIMITED
Product Type:	Internal Driver/Line Voltage (UL Type B) Lamps
Rated Voltage/Frequency:	120-277V AC, 50/60Hz
Rated Power:	10W
Rated luminous flux:	1500lm
Nominal CCT:	3500K/ 4000K/ 5000K/ 6500K
LED Manufacturer:	Bridgelux Inc.
LED Model No.:	BXEN-35E-11M-3CA, BXEN-65E-11M-3CA

2. Standards Used

- ANSI/IES LM-79-19:APPROVED METHOD:OPTICAL AND ELECTRICAL MEASUREMENTS OF SOLID-STATE LIGHTING PRODUCTS
- IES TM-30-18 IES Method for Evaluating Light Source Color Rendition (This Method is not in Nvlap accreditation scope)
- ANSI C82.77-10:2014 Harmonic Emission Limits – Related Power Quality Requirements for Lighting Equipment-Solid State

3. Test equipment list

Test Equipment	Serial No.	Model No.	Calibration due date
Full-field Speed Goniophotometer	MD-E028	GO-R5000	2023/09/17
Digital Power Meter	MD-E001	PF2010	2023/09/17
AC Testing Power Source	MD-E002	DPS1060	2023/09/17
Total Spectral Radiant Flux Standard Lamp	MD-E007	D908S	2023/10/13
Integrating Sphere System	MD-E029	2M	2023/09/17
High Accuracy Array Spectroradiometer	MD-E011	HAAS-3000	2023/09/17
Digital Power Meter	MD-E008	PF310	2023/09/17
AC Testing Power Source	MD-E010	DPS1010	2023/09/17
Standard Lamp	MD-E036	D204	2023/10/13

Statement of Traceability: Guangdong Meide Testing Technology Co., Ltd. attested that all calibration has been performed using suitable standards traceable to national primary standards and International System of Unit(SI).

4. Test Method

Requirements of Ambient Condition

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 between 10% and 65%.

Goniophotometer System

The sample was tested according to the ANSI/IES LM-79-19.

Photometric parameters were measured using a type C goniophotometer and software. The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, Luminous efficacy, zonal flux were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals. Photometric distance was more than five times of the Largest dimension of the test SSL product.

Integrating Sphere System

The sample was tested according to the ANSI/IES LM-79-19.

The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions was using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Fidelity Index (R_f) and Gamut Index (R_g) Calculation

The R_f , 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.

THD and PF Test

The sample was tested according to the ANSI C82.77-10:2014.

The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

5. Integrating Sphere Test Results

5.1 Test Data

Test Ambient Temperature (Integrating sphere internal temperature)	25.3℃	Test orientation	Downward
Operate time(Min.)	60	stabilization time(Min.)	30

Optical and Electrical Measurement Result

Model	Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)	CCT (K)
5804AP10WB1358F	120.08	60	0.0902	10.5	0.9693	1718	163.65	3500
5804AP10WB1658F	120.08	60	0.09125	10.6	0.9675	1751.7	165.24	6489

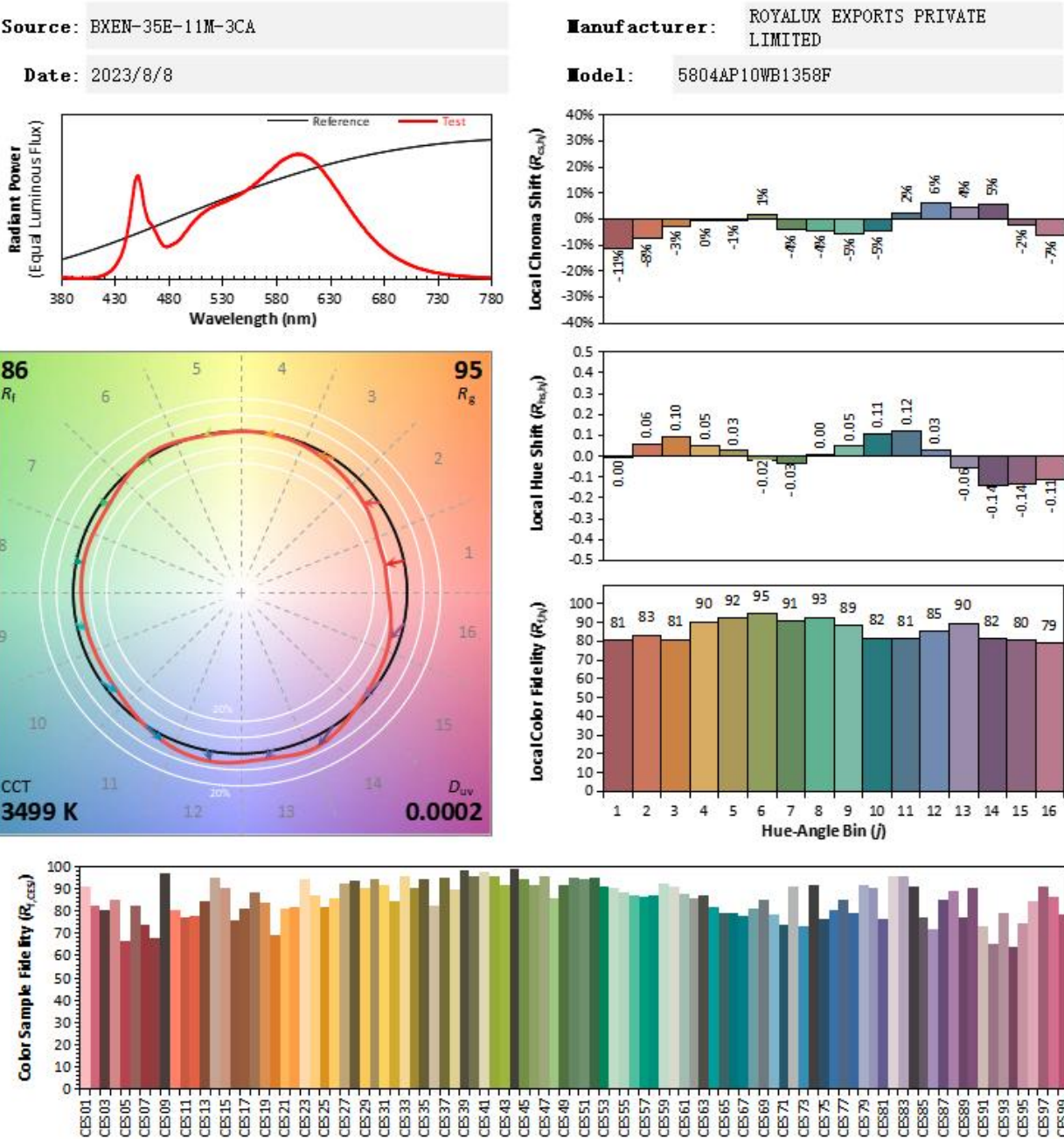
Model	Ra	R9	Rf	Rg	x	y	u'	v'	Duv
5804AP10WB1358F	84.4	11	86	95	0.4056	0.3915	0.2356	0.5116	2.83E-04
5804AP10WB1658F	83	12	84	98	0.313	0.3291	0.198	0.4684	3.13E-03

5.2 Color Rendering Index for Model # 5804AP10WB1358F

<div>Ra</div> <div>84.4</div>									
<div>R1</div> <div>83</div>	<div>R2</div> <div>92</div>	<div>R3</div> <div>97</div>	<div>R4</div> <div>83</div>	<div>R5</div> <div>83</div>	<div>R6</div> <div>89</div>	<div>R7</div> <div>85</div>	<div>R8</div> <div>63</div>	<div>R9</div> <div>11</div>	<div>R10</div> <div>80</div>
<div>R11</div> <div>83</div>	<div>R12</div> <div>69</div>	<div>R13</div> <div>85</div>	<div>R14</div> <div>99</div>	<div>R15</div> <div>76</div>					

*5.3.1 ANSI/IES TM-30-18 Color Rendition Report for Model # 5804AP10WB1358F

ANSI/IES TM-30-18 Color Rendition Report



Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

***5.3.2 ANSI/IES TM-30-18 Color Rendition Report for Model # 5804AP10WB1658F**

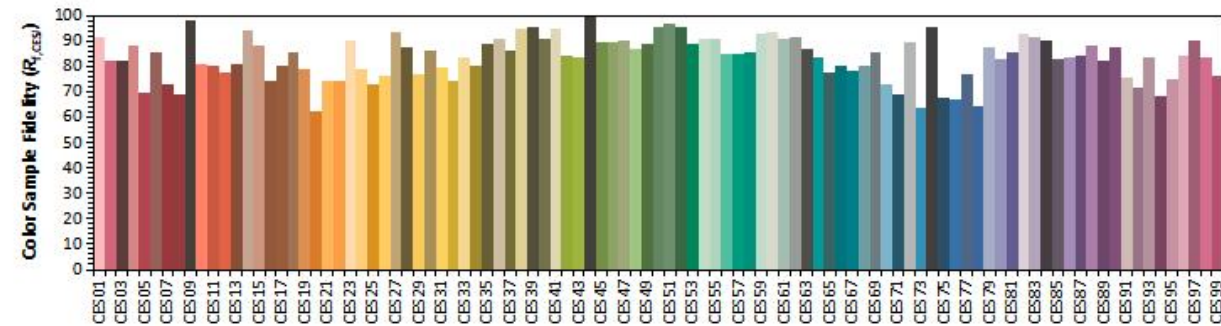
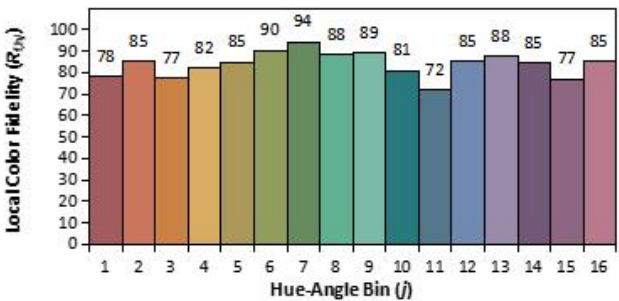
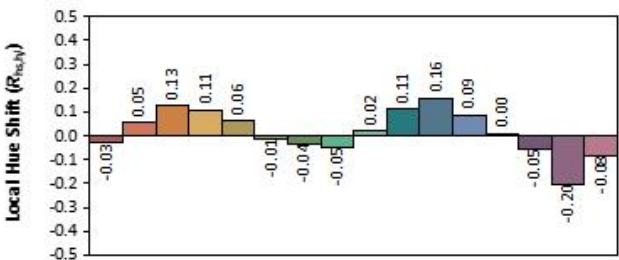
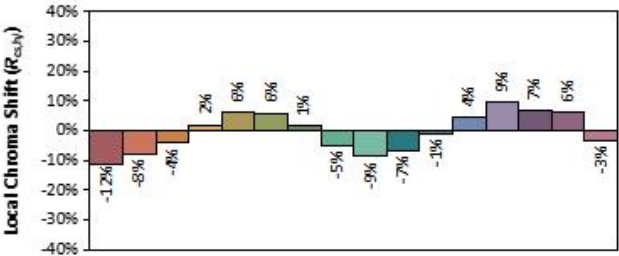
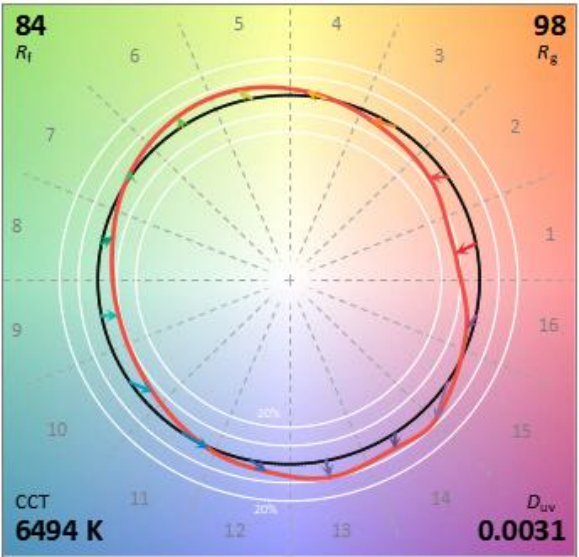
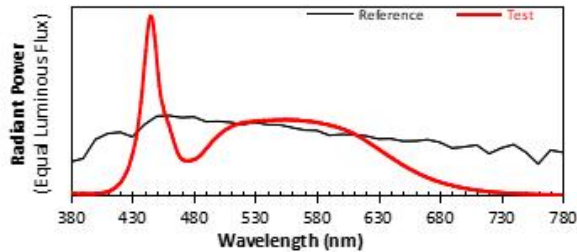
ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-65E-11M-3CA

Date: 2023/8/8

Manufacturer: ROYALUX EXPORTS PRIVATE LIMITED

Model: 5804AP10WB1658F



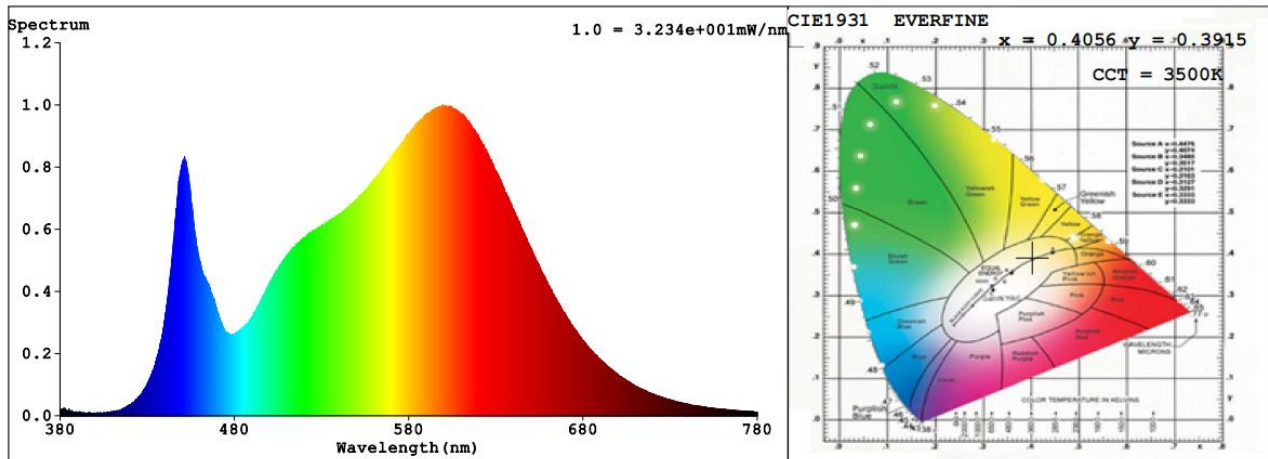
Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x **0.3129**
 y **0.3289**
 u' **0.1980**
 v' **0.4683**

CIE 13.3-1995
(CRI)
 R_a 83
 R_g 12

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

5.4 Relative Spectral Power Distribution for Model # 5804AP10WB1358F



nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.0199	414	0.0168	448	0.7345	482	0.2691	516	0.5525
381	0.0197	415	0.0183	449	0.7824	483	0.2753	517	0.5564
382	0.0116	416	0.0227	450	0.8073	484	0.2753	518	0.564
383	0.0102	417	0.0249	451	0.8214	485	0.2837	519	0.5668
384	0.0167	418	0.028	452	0.8212	486	0.2864	520	0.5722
385	0.0172	419	0.0304	453	0.7902	487	0.2915	521	0.5775
386	0.0105	420	0.0339	454	0.7546	488	0.3002	522	0.5761
387	0.0098	421	0.0372	455	0.7109	489	0.3051	523	0.5822
388	0.0097	422	0.0415	456	0.6561	490	0.3153	524	0.5892
389	0.0105	423	0.0481	457	0.5987	491	0.3198	525	0.5949
390	0.0101	424	0.0519	458	0.5578	492	0.334	526	0.5937
391	0.0079	425	0.0579	459	0.5255	493	0.3423	527	0.5979
392	0.0095	426	0.0634	460	0.4961	494	0.3563	528	0.6055
393	0.0065	427	0.0719	461	0.467	495	0.3693	529	0.6042
394	0.0081	428	0.0803	462	0.4548	496	0.3775	530	0.6118
395	0.0063	429	0.09	463	0.4462	497	0.387	531	0.6106
396	0.0053	430	0.1007	464	0.4333	498	0.4004	532	0.6161
397	0.0084	431	0.1121	465	0.4229	499	0.4092	533	0.6209
398	0.0073	432	0.1247	466	0.4104	500	0.4244	534	0.6212
399	0.0078	433	0.1407	467	0.3906	501	0.4341	535	0.6308
400	0.0088	434	0.1577	468	0.3738	502	0.4435	536	0.6302
401	0.0068	435	0.1717	469	0.359	503	0.4528	537	0.6349
402	0.0082	436	0.1905	470	0.3388	504	0.4639	538	0.6393
403	0.0097	437	0.2147	471	0.3202	505	0.4715	539	0.6424
404	0.0078	438	0.2406	472	0.3062	506	0.4811	540	0.648
405	0.0088	439	0.2668	473	0.2915	507	0.4879	541	0.6508
406	0.0087	440	0.3062	474	0.2804	508	0.4989	542	0.6542
407	0.0105	441	0.3377	475	0.2686	509	0.5035	543	0.6585
408	0.0109	442	0.389	476	0.2628	510	0.5149	544	0.665
409	0.0097	443	0.4341	477	0.2611	511	0.5196	545	0.6658
410	0.0121	444	0.4914	478	0.2581	512	0.5272	546	0.6731
411	0.0134	445	0.5516	479	0.2593	513	0.5322	547	0.6776
412	0.0144	446	0.6126	480	0.2606	514	0.5404	548	0.6813
413	0.0145	447	0.6705	481	0.2647	515	0.5439	549	0.6869

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
550	0.6918	599	0.9937	648	0.5665	697	0.1469	746	0.0307
551	0.6996	600	0.9971	649	0.5499	698	0.1413	747	0.0297
552	0.7049	601	0.9943	650	0.5371	699	0.1372	748	0.0279
553	0.7102	602	0.9924	651	0.5268	700	0.1339	749	0.0282
554	0.7157	603	0.994	652	0.5148	701	0.1259	750	0.0271
555	0.7242	604	0.9932	653	0.4993	702	0.1256	751	0.0258
556	0.7295	605	0.9915	654	0.491	703	0.1195	752	0.0258
557	0.7333	606	0.9866	655	0.4813	704	0.117	753	0.0246
558	0.7382	607	0.9853	656	0.4675	705	0.1131	754	0.0245
559	0.7515	608	0.9765	657	0.4548	706	0.1102	755	0.0233
560	0.7578	609	0.9733	658	0.4458	707	0.1064	756	0.0229
561	0.761	610	0.971	659	0.4363	708	0.1017	757	0.0226
562	0.7687	611	0.9648	660	0.422	709	0.0988	758	0.0211
563	0.7781	612	0.9617	661	0.416	710	0.0947	759	0.0217
564	0.7838	613	0.9549	662	0.4063	711	0.0928	760	0.0198
565	0.7936	614	0.947	663	0.3917	712	0.0884	761	0.0193
566	0.8026	615	0.9371	664	0.3783	713	0.0868	762	0.0193
567	0.8033	616	0.9329	665	0.3707	714	0.084	763	0.0192
568	0.8151	617	0.925	666	0.3607	715	0.082	764	0.0179
569	0.8213	618	0.9181	667	0.3528	716	0.0803	765	0.0181
570	0.8296	619	0.9085	668	0.3399	717	0.0769	766	0.0175
571	0.8389	620	0.9024	669	0.3338	718	0.0736	767	0.0162
572	0.8471	621	0.8869	670	0.325	719	0.0722	768	0.0164
573	0.8541	622	0.8775	671	0.3129	720	0.0714	769	0.0152
574	0.857	623	0.8685	672	0.3067	721	0.0691	770	0.0153
575	0.8668	624	0.8554	673	0.297	722	0.0651	771	0.0144
576	0.8724	625	0.8463	674	0.2893	723	0.0637	772	0.0142
577	0.8801	626	0.8327	675	0.2786	724	0.0621	773	0.0141
578	0.8906	627	0.8216	676	0.2723	725	0.0594	774	0.014
579	0.9015	628	0.8117	677	0.2641	726	0.0573	775	0.014
580	0.9006	629	0.7992	678	0.2579	727	0.0551	776	0.0124
581	0.9104	630	0.789	679	0.2503	728	0.0536	777	0.0132
582	0.9217	631	0.7787	680	0.2413	729	0.0514	778	0.0124
583	0.9285	632	0.7627	681	0.2352	730	0.0516	779	0.0113
584	0.9346	633	0.752	682	0.2296	731	0.0494	780	0.0114
585	0.9446	634	0.7395	683	0.2226	732	0.0471		
586	0.9453	635	0.7248	684	0.2139	733	0.0459		
587	0.9526	636	0.7138	685	0.2085	734	0.0435		
588	0.9544	637	0.7048	686	0.203	735	0.0424		
589	0.9638	638	0.6907	687	0.1964	736	0.042		
590	0.9641	639	0.679	688	0.1917	737	0.0405		
591	0.9708	640	0.6645	689	0.185	738	0.0393		
592	0.9756	641	0.654	690	0.1778	739	0.0385		
593	0.9771	642	0.6386	691	0.1749	740	0.0361		
594	0.9834	643	0.6252	692	0.1697	741	0.0356		
595	0.9852	644	0.6155	693	0.165	742	0.0345		
596	0.9916	645	0.601	694	0.1593	743	0.0331		
597	0.9901	646	0.588	695	0.1531	744	0.0327		
598	0.9914	647	0.5766	696	0.1513	745	0.0318		

6. Goniophotometer Test results for Model # 5804AP10WB1358F

6.1 Test Data

Test Ambient Temperature	25.2°C	Test orientation	Downward
Operate time(Min.)	90	stabilization time(Min.)	30

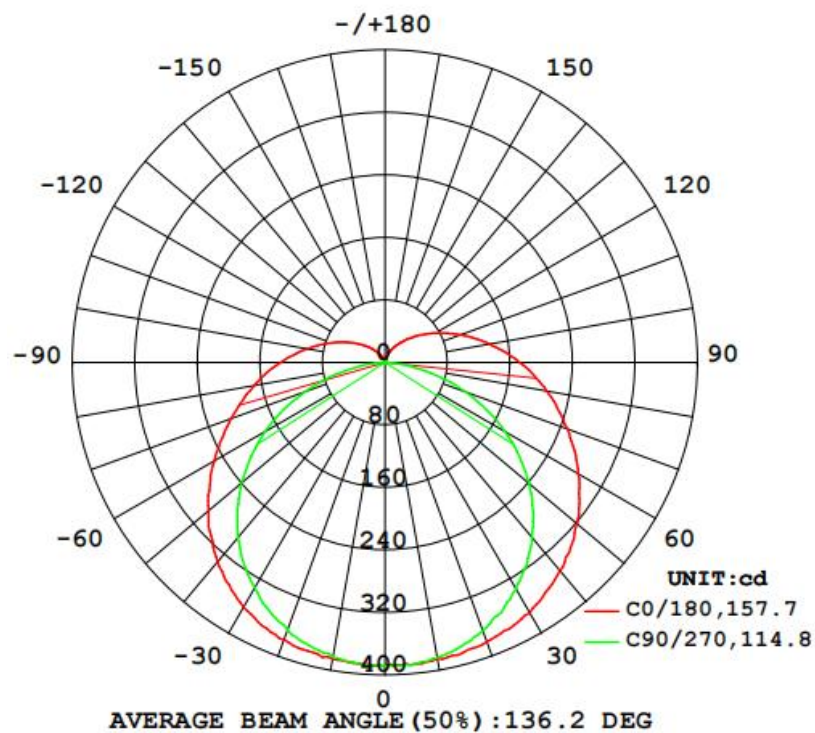
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current(A)	Power Factor	Power(W)
120	60	0.0904	0.9678	10.5

Optical Measurement

Luminous Flux (lm)	Efficacy(lm/W)	Spacing Criteria (C0/180°)	Spacing Criteria (C90/270°)	Beam Angle
1711.91	163.1	1.38	1.28	136.2°

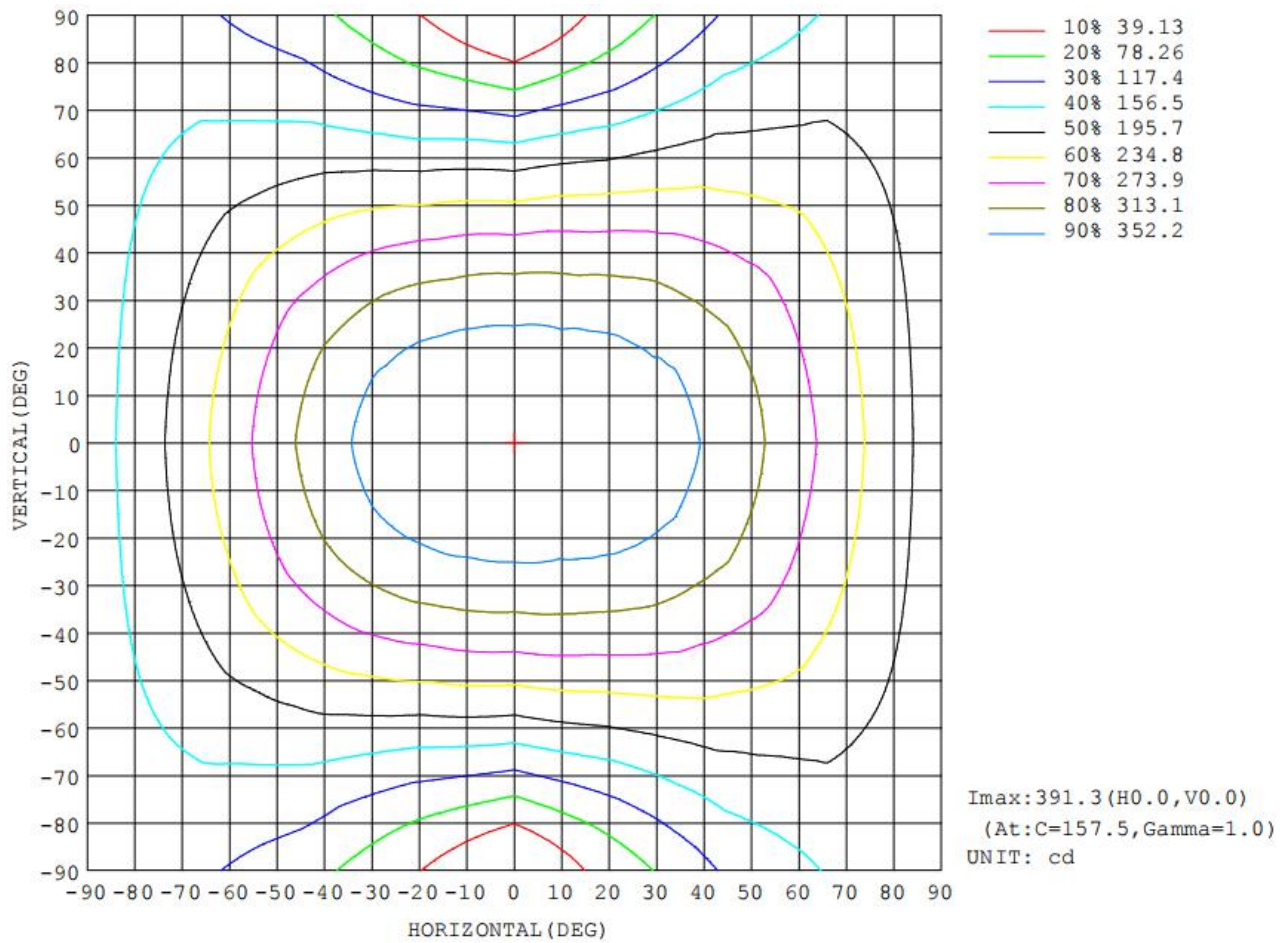
6.2 Luminous Intensity Distribution



6.3 Zonal Flux Diagram

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum, lamp
10	385.0	386.4	383.5	385.1	385.5	385.0	383.1	384.7	0- 10	36.96	36.96	2.16,2.16
20	380.4	374.8	365.4	372.9	377.7	371.8	364.7	374.7	10- 20	107.5	144.5	8.44,8.44
30	370.5	354.2	335.1	349.8	362.0	348.4	333.6	354.1	20- 30	167.7	312.2	18.2,18.2
40	347.9	324.4	292.5	315.4	333.4	314.5	293.0	324.8	30- 40	210.5	522.6	30.5,30.5
50	321.1	288.7	240.5	272.1	295.0	270.1	238.9	289.2	40- 50	230.9	753.6	44,44
60	285.1	246.4	177.8	222.8	252.4	221.2	176.9	247.3	50- 60	227.1	980.7	57.3,57.3
70	248.3	201.9	108.9	173.9	209.9	172.6	108.0	202.3	60- 70	202.2	1183	69.1,69.1
80	209.5	160.0	40.00	131.3	170.1	130.2	40.02	161.2	70- 80	164.2	1347	78.7,78.7
90	172.6	123.4	0.2102	95.58	134.0	94.42	0.2221	123.1	80- 90	123.3	1470	85.9,85.9
100	136.1	88.72	0.2481	64.79	101.7	64.05	0.2491	89.33	90-100	88.67	1559	91.1,91.1
110	103.6	62.43	0.4490	42.03	73.80	41.73	0.3768	62.66	100-110	61.22	1620	94.6,94.6
120	75.52	43.58	0.7325	26.58	51.18	26.44	0.5546	43.48	110-120	40.31	1661	97,97
130	53.04	30.11	1.011	16.26	33.45	16.32	0.8178	30.18	120-130	25.07	1686	98.5,98.5
140	35.22	20.45	1.277	9.552	20.23	9.982	0.8565	20.13	130-140	14.44	1700	99.3,99.3
150	21.97	13.57	1.448	5.112	10.91	6.353	0.7584	11.68	140-150	7.467	1708	99.7,99.7
160	12.54	7.375	1.457	2.286	4.724	3.644	0.7026	5.199	150-160	3.193	1711	99.9,99.9
170	6.075	3.626	1.411	0.6370	1.260	1.014	0.8893	2.790	160-170	0.9753	1712	100,100
180	1.005	1.480	1.576	1.461	1.095	1.314	1.535	1.549	170-180	0.1665	1712	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

6.4 Isocandela Diagram



6.5 Luminous Distribution Intensity Data

Table--1

UNIT: cd

C (DEG) γ (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5			
0	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389			
5	389	389	388	389	389	388	389	391	387	387	388	389	387	390	389	389			
10	385	387	386	385	384	384	385	388	385	386	385	384	383	385	385	387			
15	385	384	381	379	377	378	379	384	382	382	380	376	375	378	380	385			
20	380	381	375	370	365	368	373	380	378	377	372	367	365	368	375	381			
25	376	374	366	358	353	356	362	371	372	368	361	354	351	357	365	373			
30	370	365	354	342	335	340	350	360	362	358	348	339	334	340	354	366			
35	359	355	342	324	316	322	334	348	348	343	333	320	315	323	340	357			
40	348	344	324	305	292	300	315	331	333	326	315	300	293	304	325	345			
45	336	329	308	283	268	276	295	311	315	310	293	275	267	282	308	330			
50	321	313	289	258	240	249	272	291	295	288	270	249	239	258	289	314			
55	304	295	267	233	209	221	247	268	274	267	246	220	209	232	268	298			
60	285	277	246	205	178	192	223	246	252	244	221	190	177	204	247	280			
65	268	258	223	176	143	161	198	223	230	222	196	160	143	176	224	260			
70	248	237	202	148	109	133	174	201	210	200	173	132	108	148	202	240			
75	229	218	181	123	73.4	106	152	180	189	180	151	105	72.8	121	181	220			
80	210	198	160	98.3	40.0	82.2	131	161	170	160	130	80.8	40.0	97.0	161	201			
85	192	179	141	77.4	13.6	61.9	113	142	152	142	112	61.2	13.1	75.9	142	182			
90	173	161	123	59.2	0.21	44.8	95.6	125	134	124	94.4	44.5	0.22	58.3	123	163			
95	154	142	106	44.2	0.18	31.5	79.5	108	117	108	78.4	31.4	0.23	43.4	105	145			
100	136	126	88.7	33.3	0.25	22.0	64.8	92.8	102	92.2	64.0	22.0	0.25	33.1	89.3	127			
105	120	109	74.6	25.9	0.34	15.8	52.4	78.6	87.1	78.0	51.8	15.8	0.31	25.8	74.8	110			
110	104	93.4	62.4	20.8	0.45	11.7	42.0	66.0	73.8	65.6	41.7	11.6	0.38	20.8	62.7	94.2			
115	89.0	79.7	52.2	17.3	0.59	8.84	33.6	54.7	62.0	54.2	33.2	8.80	0.45	17.3	52.1	80.5			
120	75.5	67.3	43.6	14.8	0.73	6.84	26.6	44.7	51.2	44.4	26.4	6.80	0.55	14.7	43.5	68.2			
125	63.7	56.5	36.2	12.8	0.86	5.36	20.9	36.0	41.9	35.8	20.8	5.34	0.65	12.7	36.2	57.2			
130	53.0	46.8	30.1	11.2	1.01	4.24	16.3	28.5	33.5	28.5	16.3	4.25	0.82	10.5	30.2	47.3			
135	43.5	38.5	24.8	9.57	1.16	3.34	12.6	22.2	26.3	22.3	12.7	3.44	0.92	9.30	24.8	38.9			
140	35.2	31.2	20.4	8.61	1.28	2.61	9.55	16.9	20.2	17.3	9.98	2.90	0.86	8.13	20.1	31.4			
145	28.1	25.0	16.6	7.50	1.38	1.98	7.09	12.6	15.1	13.2	7.94	2.57	0.81	6.67	15.8	24.7			
150	22.0	19.7	13.6	6.48	1.45	1.40	5.11	9.00	10.9	9.88	6.35	2.36	0.76	4.85	11.7	18.9			
155	16.7	15.1	10.4	5.08	1.47	0.90	3.55	6.18	7.55	7.12	4.96	2.13	0.71	3.33	8.21	13.9			
160	12.5	11.5	7.37	3.98	1.46	0.59	2.29	3.98	4.72	4.77	3.64	1.75	0.70	2.24	5.20	8.71			
165	9.03	8.11	5.20	3.07	1.44	0.62	1.19	2.26	2.80	2.79	2.17	1.11	0.76	1.66	3.78	5.88			
170	6.08	4.71	3.63	2.56	1.41	0.76	0.64	0.91	1.26	1.27	1.01	0.74	0.89	1.53	2.79	3.90			
175	3.58	2.37	2.47	1.99	1.49	1.12	0.87	0.74	0.74	0.74	0.79	0.91	1.15	1.53	2.03	2.61			
180	1.01	1.32	1.48	1.53	1.58	1.56	1.46	1.30	1.10	1.00	1.31	1.45	1.53	1.57	1.55	1.48			

7. THD and PF Test

Model Number	Voltage (V AC)	Frequency (Hz)	Power Factor	THD (%)
5804AP10WB1358F	120.0	60	0.967	23.6
	277.0	60	0.962	11.2
5804AP10WB1658F	120.0	60	0.965	23.2
	277.0	60	0.962	11.5

8. Photo of sample

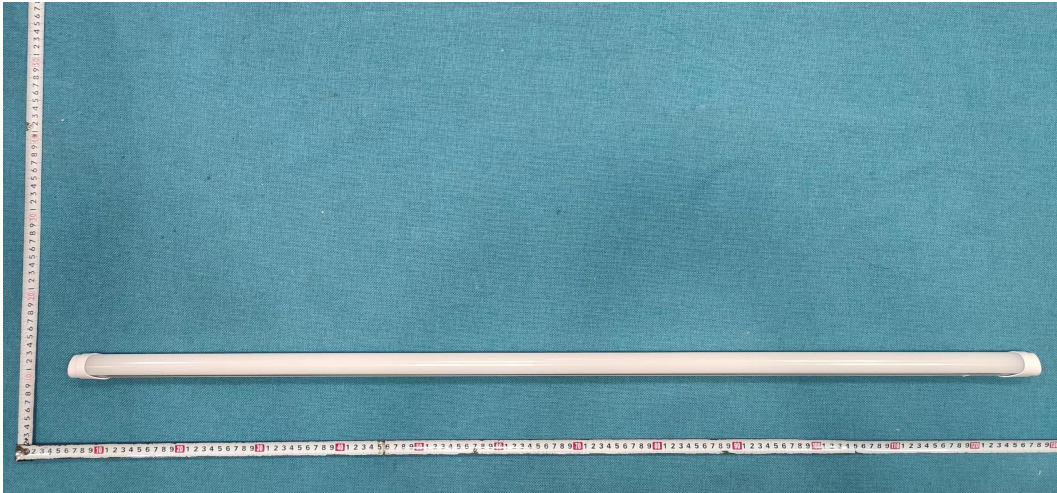


Figure 1

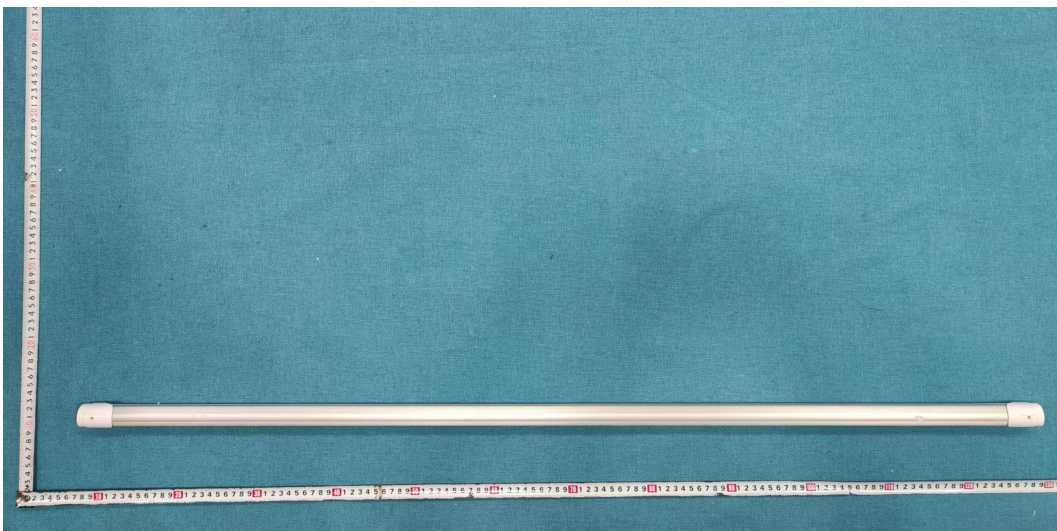


Figure 2

---End of Report---