



Test Report Of ANSI/IES LM-79-19

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

Report Number..... : N02A23040544L00201

Client..... : ROYALUX EXPORTS

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

Test Model..... : 5804AP12WB1358F, 5804AP12WB1658F

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 use 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:	5804AP12WB1358F, 5804AP12WB1658F
Model No.:	5804AP12WB1358F, 5804AP12WB1408F, 5804AP12WB1508F, 5804AP12WB1658F (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:	12W
Rated luminous flux:	1800lm
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)
5804AP12WB1358F	120.11	60	0.09835	11.46	0.9676	1826.1	159.33	3510
5804AP12WB1658F	120.07	60	0.09992	11.59	0.9662	1866.1	160.99	6493

Model	Ra	R9	Rf	Rg	x	y	u'	v'	Duv
5804AP12WB1358F	84.3	12	86	95	0.4051	0.3913	0.2353	0.5115	3.11E-04
5804AP12WB1658F	83.1	12	84	98	0.3129	0.329	0.198	0.4684	3.09E-03

5.2 Color Rendering Index for Model # 5804AP12WB1358F

Ra 84.3				
R1 83	R2 91	R3 97	R4 83	R5 83
R6 89	R7 85	R8 63	R9 12	R10 80
R11 83	R12 69	R13 85	R14 99	R15 76

*5.3.1 ANSI/IES TM-30-18 Color Rendition Report for Model # 5804AP12WB1358F

ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-35E-11M-3CA

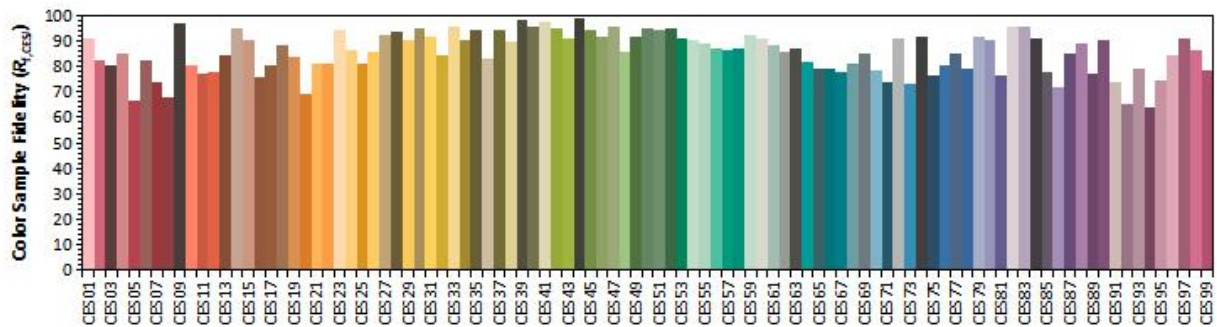
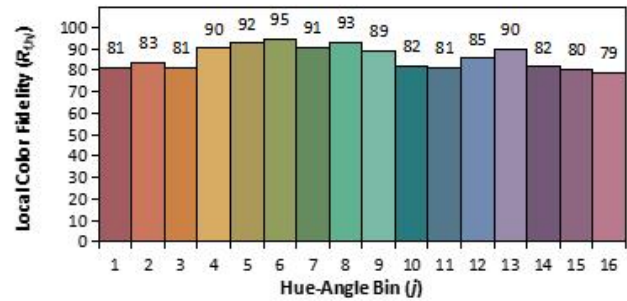
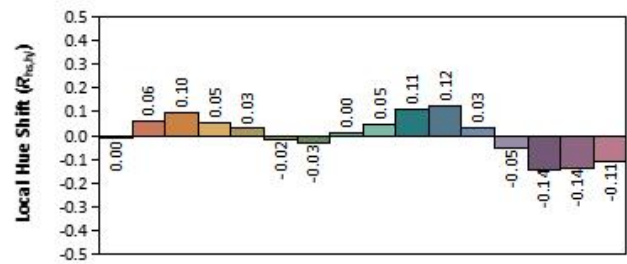
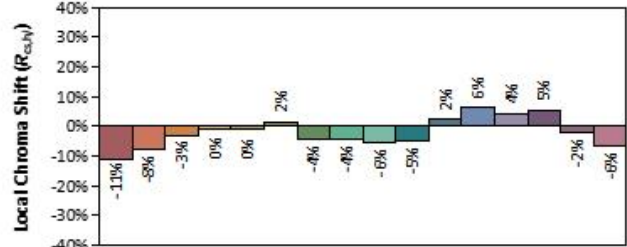
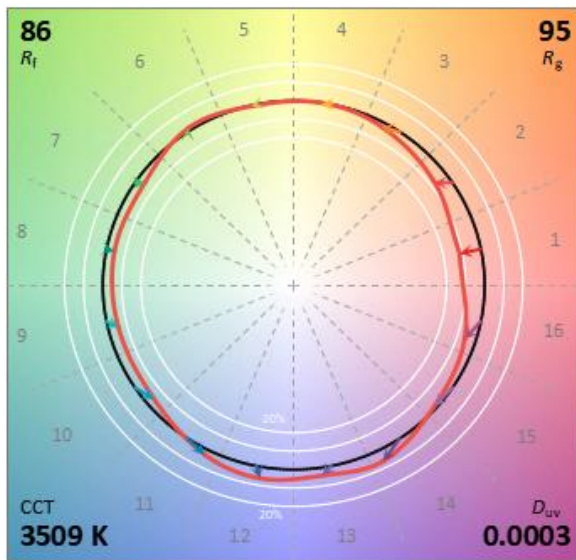
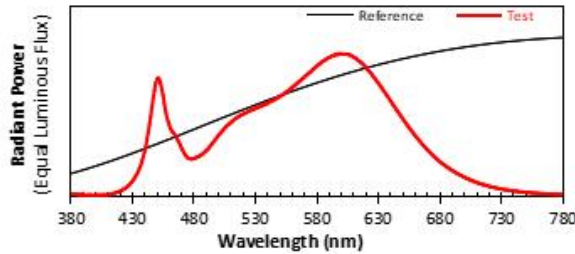
Date: 2023/8/8

Manufacturer:

ROYALUX EXPORTS PRIVATE
LIMITED

Model:

5804AP12WB1358F



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

x 0.4051

y 0.3912

u' 0.2354

v' 0.5114

CIE 13.3-1995
(CRI)

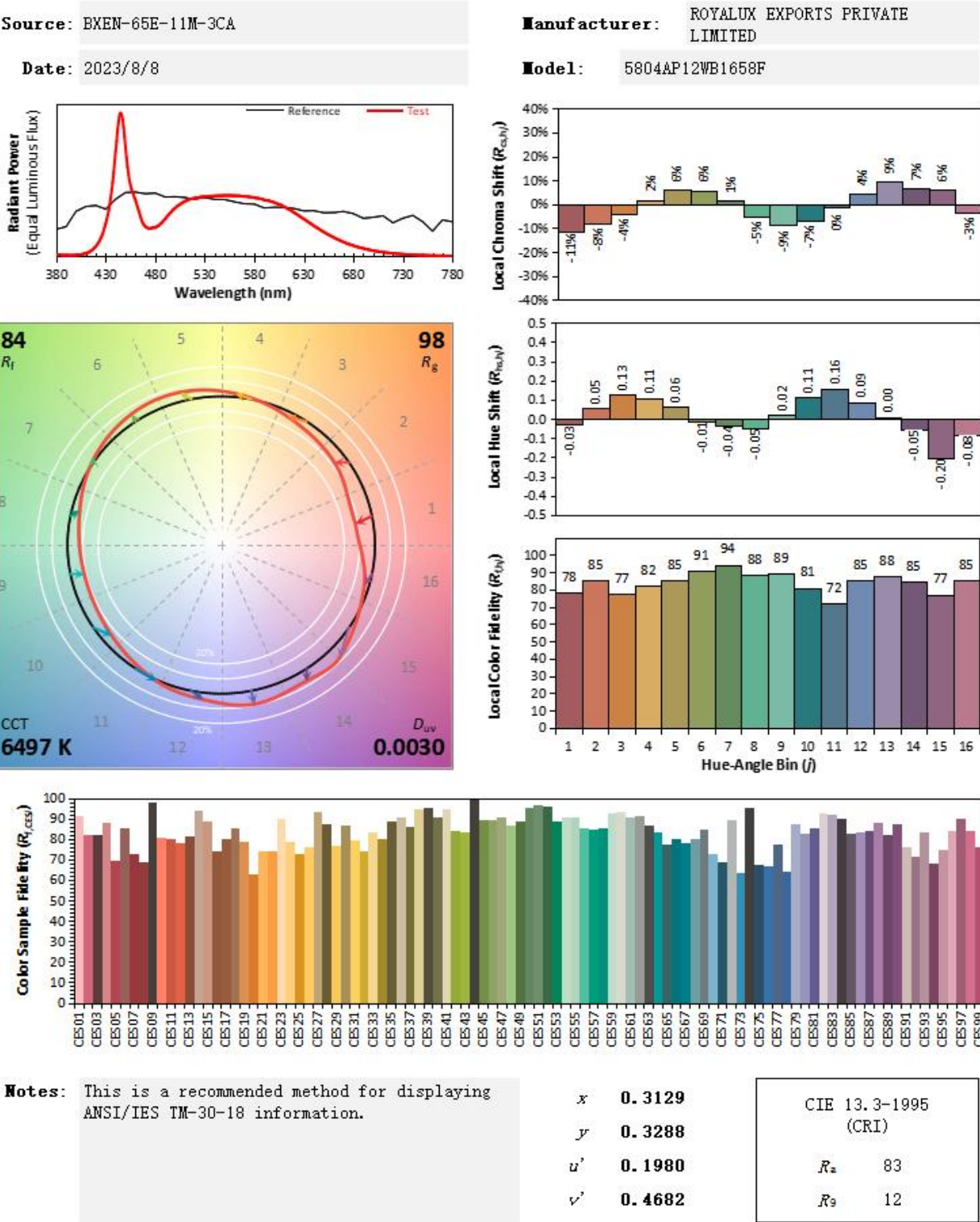
R_a 84

R_g 12

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 # 5804AP12WB1658F

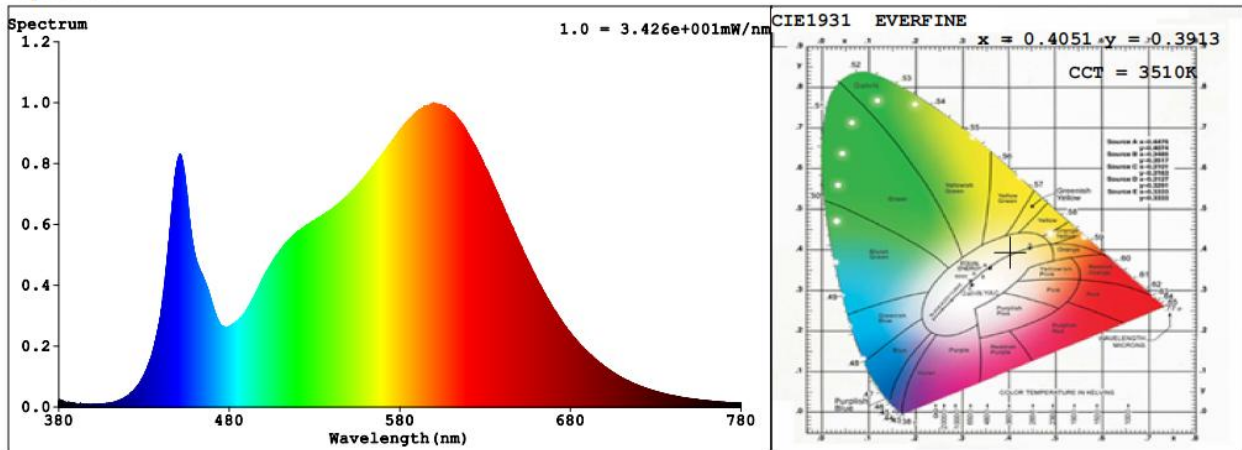
ANSI/IES TM-30-18 Color Rendition Report



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

5.4 Relative Spectral Power Distribution for Model # 5804AP12WB1358F

Spectrum



nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.0195	414	0.0187	448	0.737	482	0.2712	516	0.5543
381	0.0143	415	0.0208	449	0.7869	483	0.2739	517	0.5595
382	0.0161	416	0.0227	450	0.8131	484	0.2781	518	0.5648
383	0.0172	417	0.0258	451	0.8264	485	0.2823	519	0.5686
384	0.0143	418	0.0282	452	0.8132	486	0.2898	520	0.5734
385	0.0131	419	0.0322	453	0.7885	487	0.294	521	0.5781
386	0.0131	420	0.0354	454	0.7449	488	0.3015	522	0.5813
387	0.0096	421	0.0393	455	0.705	489	0.3083	523	0.5851
388	0.0114	422	0.0445	456	0.6495	490	0.3192	524	0.5905
389	0.0134	423	0.0502	457	0.5972	491	0.3237	525	0.5938
390	0.0116	424	0.0542	458	0.5559	492	0.3353	526	0.5993
391	0.0069	425	0.0605	459	0.5264	493	0.347	527	0.6018
392	0.0077	426	0.0667	460	0.4993	494	0.3575	528	0.6066
393	0.0079	427	0.075	461	0.4729	495	0.3676	529	0.6092
394	0.0082	428	0.0842	462	0.4579	496	0.3796	530	0.6129
395	0.0097	429	0.0932	463	0.4472	497	0.3905	531	0.6165
396	0.0094	430	0.1045	464	0.4365	498	0.4013	532	0.6206
397	0.008	431	0.1173	465	0.4221	499	0.4133	533	0.6236
398	0.0075	432	0.1283	466	0.4085	500	0.4257	534	0.6266
399	0.0074	433	0.1444	467	0.3912	501	0.4353	535	0.6314
400	0.0078	434	0.1569	468	0.3767	502	0.4451	536	0.6328
401	0.0067	435	0.1784	469	0.3556	503	0.4536	537	0.6385
402	0.0096	436	0.1981	470	0.3358	504	0.4643	538	0.6418
403	0.0091	437	0.2199	471	0.3203	505	0.4755	539	0.6453
404	0.0073	438	0.2474	472	0.304	506	0.4833	540	0.6477
405	0.0098	439	0.2781	473	0.2917	507	0.4925	541	0.6544
406	0.0089	440	0.3133	474	0.2778	508	0.4986	542	0.6598
407	0.0098	441	0.3482	475	0.2686	509	0.5071	543	0.6625
408	0.0086	442	0.4001	476	0.2635	510	0.5136	544	0.6669
409	0.0109	443	0.449	477	0.2626	511	0.5216	545	0.6713
410	0.0124	444	0.5026	478	0.26	512	0.5299	546	0.6767
411	0.0132	445	0.559	479	0.2608	513	0.5356	547	0.682
412	0.0144	446	0.622	480	0.2635	514	0.5422	548	0.6859
413	0.0154	447	0.6856	481	0.2649	515	0.5484	549	0.6922

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
550	0.6966	599	0.9939	648	0.5649	697	0.1451	746	0.0306
551	0.7029	600	0.9929	649	0.5522	698	0.1423	747	0.0298
552	0.7084	601	0.9938	650	0.5394	699	0.1375	748	0.0291
553	0.7142	602	0.9921	651	0.5268	700	0.1324	749	0.028
554	0.7194	603	0.9925	652	0.5155	701	0.129	750	0.0276
555	0.7264	604	0.9914	653	0.5023	702	0.1243	751	0.0261
556	0.7325	605	0.9902	654	0.4903	703	0.1212	752	0.0257
557	0.7378	606	0.9878	655	0.4803	704	0.1166	753	0.0253
558	0.744	607	0.9866	656	0.4684	705	0.1135	754	0.0241
559	0.7535	608	0.9807	657	0.4568	706	0.1096	755	0.0234
560	0.7607	609	0.9767	658	0.4452	707	0.1073	756	0.0225
561	0.7653	610	0.9712	659	0.4352	708	0.1027	757	0.0224
562	0.7735	611	0.9671	660	0.4235	709	0.1	758	0.0216
563	0.7802	612	0.9616	661	0.4137	710	0.0958	759	0.0213
564	0.7904	613	0.9514	662	0.4025	711	0.0934	760	0.0203
565	0.7962	614	0.9471	663	0.3931	712	0.0902	761	0.0195
566	0.8014	615	0.9407	664	0.3818	713	0.0872	762	0.0195
567	0.811	616	0.9327	665	0.3711	714	0.0855	763	0.0189
568	0.817	617	0.9268	666	0.36	715	0.0816	764	0.0184
569	0.8244	618	0.9177	667	0.3524	716	0.0802	765	0.0181
570	0.8325	619	0.9082	668	0.3423	717	0.0776	766	0.0174
571	0.8403	620	0.8985	669	0.3329	718	0.0749	767	0.0173
572	0.8479	621	0.8864	670	0.3231	719	0.0723	768	0.016
573	0.8563	622	0.8776	671	0.3157	720	0.07	769	0.0158
574	0.862	623	0.8679	672	0.3069	721	0.0679	770	0.0152
575	0.8692	624	0.859	673	0.2975	722	0.0652	771	0.0148
576	0.8785	625	0.8479	674	0.289	723	0.0636	772	0.0149
577	0.885	626	0.8347	675	0.2803	724	0.0622	773	0.0141
578	0.8931	627	0.8265	676	0.2729	725	0.06	774	0.0137
579	0.9015	628	0.8124	677	0.2646	726	0.0577	775	0.0134
580	0.9073	629	0.8012	678	0.2571	727	0.0557	776	0.0128
581	0.9159	630	0.7907	679	0.2497	728	0.0545	777	0.0126
582	0.9246	631	0.7799	680	0.2421	729	0.0523	778	0.0126
583	0.9273	632	0.7659	681	0.2349	730	0.0509	779	0.0125
584	0.9375	633	0.7549	682	0.2285	731	0.0494	780	0.0125
585	0.9424	634	0.7401	683	0.223	732	0.048		
586	0.948	635	0.729	684	0.2153	733	0.0459		
587	0.952	636	0.7159	685	0.2102	734	0.045		
588	0.9575	637	0.7043	686	0.2027	735	0.0434		
589	0.9653	638	0.6917	687	0.1982	736	0.0424		
590	0.9696	639	0.6774	688	0.1912	737	0.0407		
591	0.9724	640	0.6652	689	0.1855	738	0.0394		
592	0.9768	641	0.6529	690	0.1798	739	0.0379		
593	0.9811	642	0.6374	691	0.1753	740	0.0367		
594	0.9836	643	0.6292	692	0.1708	741	0.0356		
595	0.9889	644	0.6138	693	0.1643	742	0.0348		
596	0.9879	645	0.6009	694	0.1596	743	0.0339		
597	0.9882	646	0.5904	695	0.1549	744	0.0329		
598	0.9957	647	0.577	696	0.1509	745	0.0314		

6. Goniophotometer Test results for Model # 5804AP12WB1358F

6.1 Test Data

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

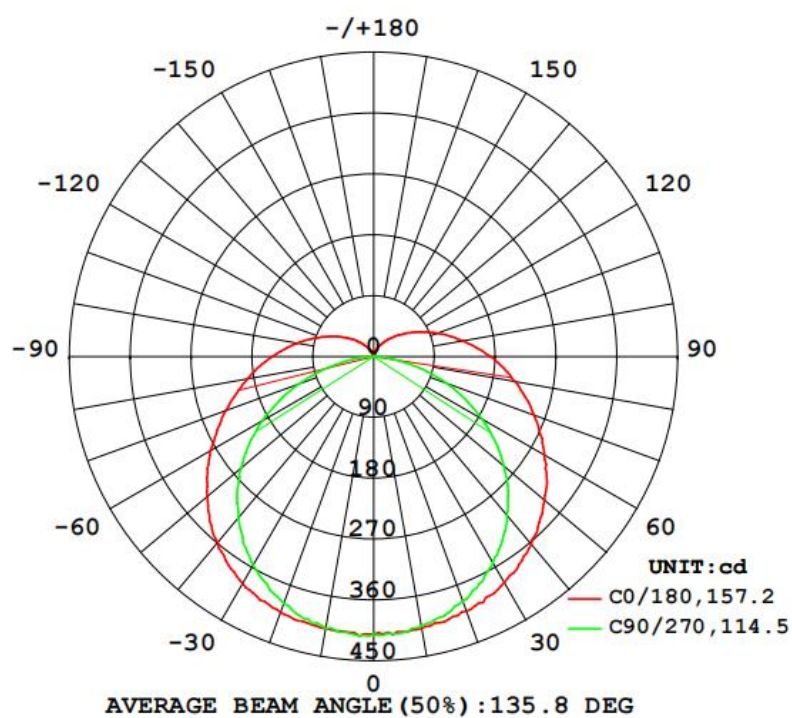
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current(A)	Power Factor	Power(W)
120	60	0.0978	0.9655	11.33

Optical Measurement

Luminous Flux (lm)	Efficacy(lm/W)	Spacing Criteria (C0/180°)	Spacing Criteria (C90/270°)	Beam Angle
1803.89	159.16	1.41	1.28	135.8°

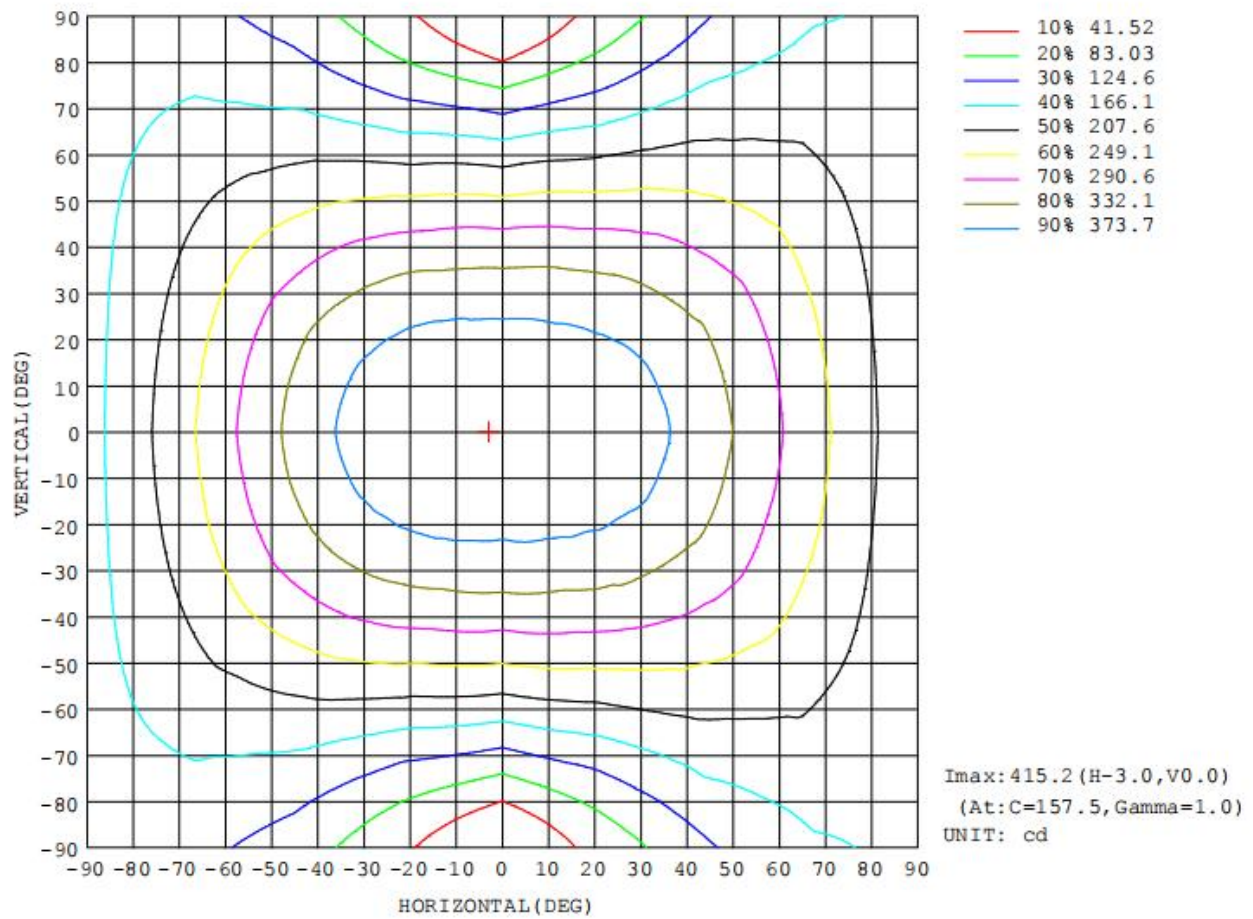
6.2 Luminous Intensity Distribution



6.3 Zonal Flux Diagram

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	ℓlum, lamp
10	408.2	404.9	405.3	406.8	408.2	407.3	407.9	407.1	0- 10	39.03	39.03	2.16, 2.16
20	400.7	391.8	385.2	394.4	402.7	396.3	388.8	396.3	10- 20	113.6	152.6	8.46, 8.46
30	386.3	370.7	352.5	372.6	387.3	372.9	356.6	373.4	20- 30	177.2	329.8	18.3, 18.3
40	362.8	336.4	306.9	336.8	358.9	338.2	311.9	341.5	30- 40	222.5	552.3	30.6, 30.6
50	330.5	296.3	251.3	291.9	321.8	293.3	255.6	301.9	40- 50	244.0	796.3	44.1, 44.1
60	292.2	250.2	185.0	239.8	278.9	241.6	190.5	257.2	50- 60	240.0	1036	57.5, 57.5
70	252.6	204.9	113.4	189.3	232.7	190.5	116.7	209.6	60- 70	213.8	1250	69.3, 69.3
80	212.8	161.2	41.17	143.3	189.2	145.0	43.25	165.2	70- 80	173.3	1423	78.9, 78.9
90	173.4	121.3	0.2563	105.6	150.7	106.4	0.2982	124.5	80- 90	129.7	1553	86.1, 86.1
100	134.3	86.94	0.2426	72.65	115.2	73.04	0.2461	88.58	90-100	92.89	1646	91.2, 91.2
110	101.2	60.44	0.3605	47.95	84.59	48.56	0.2783	61.03	100-110	63.96	1710	94.8, 94.8
120	72.72	41.12	0.5191	30.89	59.34	31.40	0.3717	41.89	110-120	41.86	1752	97.1, 97.1
130	50.49	27.95	0.6882	18.98	39.42	18.95	0.5142	28.46	120-130	25.82	1778	98.5, 98.5
140	33.08	18.65	0.8171	11.08	23.53	11.15	0.5624	18.39	130-140	14.64	1792	99.4, 99.4
150	19.91	12.00	0.8941	6.471	12.56	7.786	0.6479	9.417	140-150	7.389	1800	99.8, 99.8
160	10.96	6.300	0.9394	3.126	6.310	4.827	0.7402	4.236	150-160	3.147	1803	99.9, 99.9
170	4.756	2.813	0.9849	0.9568	1.937	1.639	0.7770	2.049	160-170	0.9409	1804	100, 100
180	0.8310	1.013	1.081	1.055	0.8112	0.9694	1.055	1.082	170-180	0.1387	1804	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	411	411	411	411	411	411	411	411	411	411	411	411	411	411	411	411			
5	408	410	408	410	411	408	411	411	409	409	411	410	410	410	410	410			
10	408	406	405	403	405	405	407	410	408	408	407	406	408	406	407	407			
15	406	402	399	396	398	397	401	407	405	406	402	400	401	399	403	406			
20	401	397	392	386	385	387	394	401	403	400	396	389	389	391	396	402			
25	394	391	383	374	370	374	386	394	398	393	387	376	372	376	384	394			
30	386	380	371	359	352	358	373	384	387	383	373	361	357	359	373	384			
35	375	369	355	340	332	337	356	371	376	369	356	342	337	340	359	373			
40	363	355	336	317	307	314	337	353	359	354	338	321	312	320	341	360			
45	347	338	317	294	282	290	316	336	344	335	318	296	286	296	322	343			
50	330	321	296	268	251	262	292	315	322	313	293	268	256	272	302	325			
55	312	301	274	239	220	233	267	292	300	291	268	239	225	242	281	305			
60	292	282	250	211	185	203	240	269	279	269	242	207	190	213	257	287			
65	272	261	228	181	150	171	215	244	255	244	216	175	154	184	234	266			
70	253	240	205	151	113	140	189	220	233	221	191	145	117	154	210	245			
75	232	220	182	124	76.5	113	165	198	210	199	167	116	79.0	126	188	224			
80	213	200	161	99.4	41.2	87.4	143	177	189	179	145	90.3	43.2	100	165	204			
85	193	180	141	77.6	13.1	66.2	123	157	170	158	125	68.5	14.3	77.7	145	184			
90	173	160	121	58.5	0.26	48.7	106	138	151	139	106	50.7	0.30	58.4	124	164			
95	153	140	104	43.2	0.25	34.7	88.2	120	132	121	88.9	36.2	0.19	43.0	105	144			
100	134	122	86.9	32.2	0.24	24.7	72.6	104	115	104	73.0	25.9	0.25	32.0	88.6	125			
105	118	106	72.2	24.8	0.30	18.0	59.4	88.4	99.2	89.3	59.9	18.9	0.25	24.6	73.6	108			
110	101	90.9	60.4	19.7	0.36	13.5	47.9	74.5	84.6	75.1	48.6	14.0	0.28	19.5	61.0	92.4			
115	86.7	76.6	49.8	16.1	0.44	10.3	38.5	62.3	71.1	62.7	39.1	10.3	0.33	15.9	50.4	78.4			
120	72.7	64.4	41.1	13.5	0.52	7.95	30.9	51.5	59.3	51.6	31.4	7.26	0.37	13.3	41.9	65.6			
125	61.1	53.7	34.0	11.6	0.61	6.40	24.3	41.7	48.7	42.1	24.7	6.15	0.44	11.3	34.3	54.8			
130	50.5	44.2	27.9	9.98	0.69	5.24	19.0	33.1	39.4	33.8	18.9	5.23	0.51	9.46	28.5	45.2			
135	41.3	35.9	22.9	8.56	0.76	4.27	14.5	25.7	31.0	26.1	14.3	4.44	0.55	8.19	23.0	36.7			
140	33.1	28.8	18.6	7.47	0.82	3.46	11.1	19.6	23.5	20.1	11.1	3.82	0.56	6.95	18.4	29.3			
145	25.9	22.9	15.0	6.38	0.86	2.70	8.53	14.1	17.4	14.8	9.32	3.52	0.58	5.54	14.2	22.7			
150	19.9	17.7	12.0	5.35	0.89	2.03	6.47	10.6	12.6	11.5	7.79	3.30	0.65	3.83	9.42	17.1			
155	15.0	13.5	8.86	4.07	0.92	1.50	4.68	7.70	9.15	8.71	6.31	2.97	0.69	2.50	7.10	11.8			
160	11.0	9.98	6.30	3.10	0.94	1.02	3.13	5.15	6.31	6.15	4.83	2.44	0.74	1.59	4.24	7.78			
165	7.64	6.72	4.21	2.34	0.96	0.68	1.83	3.11	3.84	3.76	3.07	1.78	0.76	1.22	2.89	4.91			
170	4.76	3.72	2.81	1.89	0.98	0.67	0.96	1.52	1.94	1.95	1.64	1.07	0.78	1.09	2.05	3.03			
175	2.57	1.82	1.80	1.43	1.05	0.73	0.74	0.76	0.81	0.82	0.82	0.79	0.81	1.07	1.47	1.91			
180	0.83	0.96	1.01	1.05	1.08	1.07	1.05	0.97	0.81	0.79	0.97	1.02	1.06	1.07	1.08	1.07			

7. THD and PF Test

Model Number	Voltage (V AC)	Frequency (Hz)	Power Factor	THD (%)
5804AP12WB1358F	120.0	60	0.967	24.3
	277.0	60	0.969	10.4
5804AP12WB1658F	120.0	60	0.967	24.1
	277.0	60	0.97	10.4

8. Photo of sample

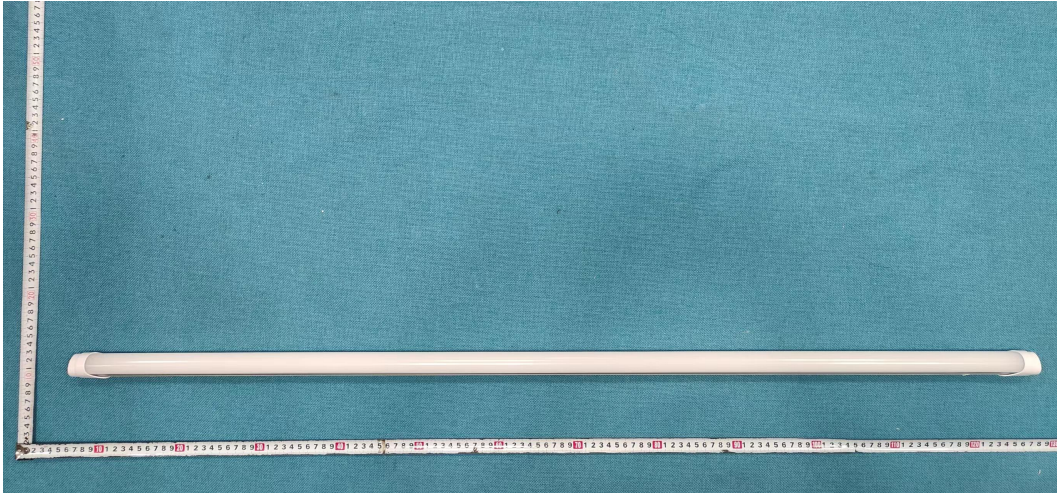


Figure 1

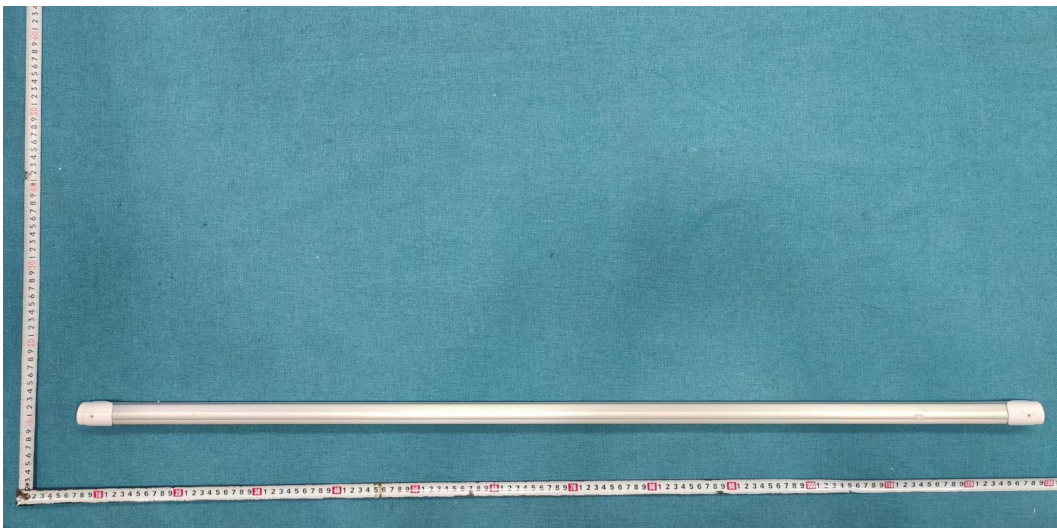


Figure 2

---End of Report---