



Test Report Of ANSI/IES LM-79-19

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

Report Number..... : N02A23080353L00601

Client..... : IKIO LED LIGHTING

Test Model..... : IK-HBAX-0100-50-DY-RLHV02BI

Address..... : 8470 Allison Pointe Blvd, Suite 128 Indianapolis, IN 46250

Brand Name..... : IKIO

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..... : Aug. 14, 2023

Date of test : Aug. 30, 2023 – Sep. 08, 2023

Date of report..... : Sep. 08, 2023

Tested by:

A handwritten signature in black ink that reads 'Jarvis Zhang'.

Jarvis Zhang/ Test Engineer

Checked by:

A handwritten signature in black ink that reads 'Sandy Chen'.

Sandy Chen/ Project Engineer

Approved by:

A handwritten signature in black ink that reads 'Jessie Li'.

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:	IK-HBAX-0100-50-DY-RLHV02BI
Manufacturer:	IKIO LED LIGHTING
Product Type:	High Bay Luminaires (Commercial and Industrial)
Rated Voltage/Frequency:	277-480V AC, 50/60Hz
Rated Power:	100W
Rated luminous flux:	14000lm
Nominal CCT:	5000K
LED Manufacturer:	Bridgelux Inc.
LED Model No.:	BXEN-50E-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 Spectroradio Meter	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

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)	CCT (K)
277.09	60	0.3615	99.97	0.998	14875	148.79	5220

Ra	R9	Rf	Rg	x	y	u'	v'	Duv
84.6	16	85	97	0.3393	0.3492	0.2084	0.4826	1.18E-03

5.2 Color Rendering Index

Ra
84.6

R1
83

R2
89

R3
92

R4
85

R5
84

R6
85

R7
88

R8
70

R9
16

R10
74

R11
85

R12
64

R13
85

R14
96

R15
79

*5.3 ANSI/IES TM-30-18 Color Rendition Report

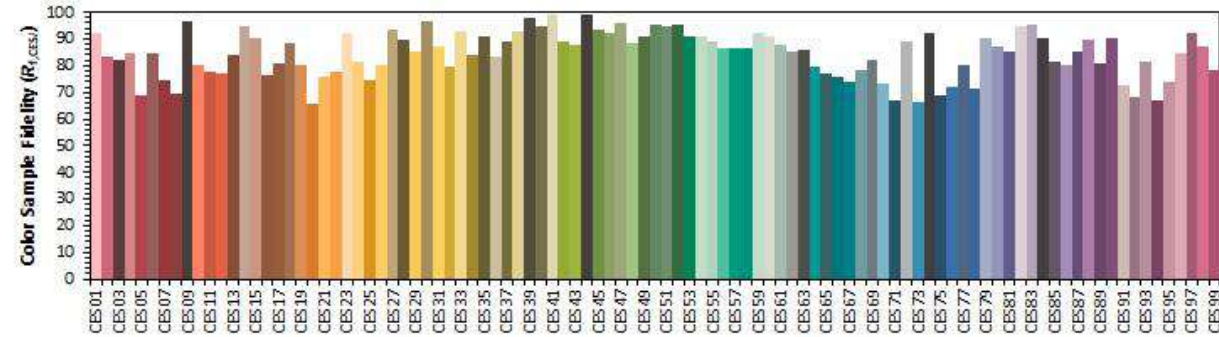
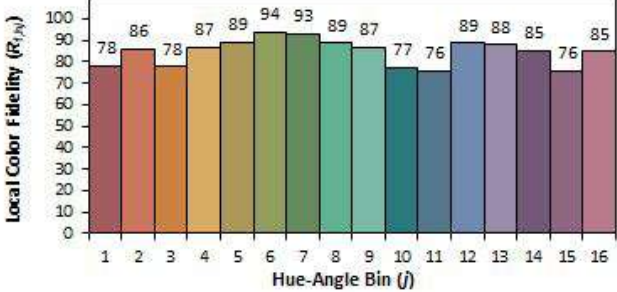
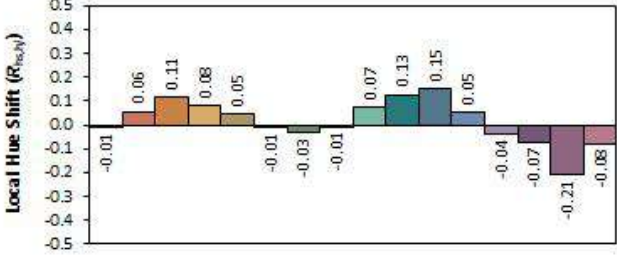
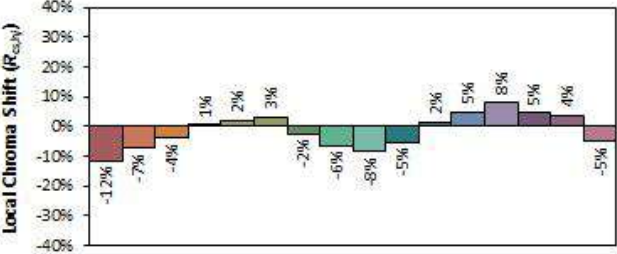
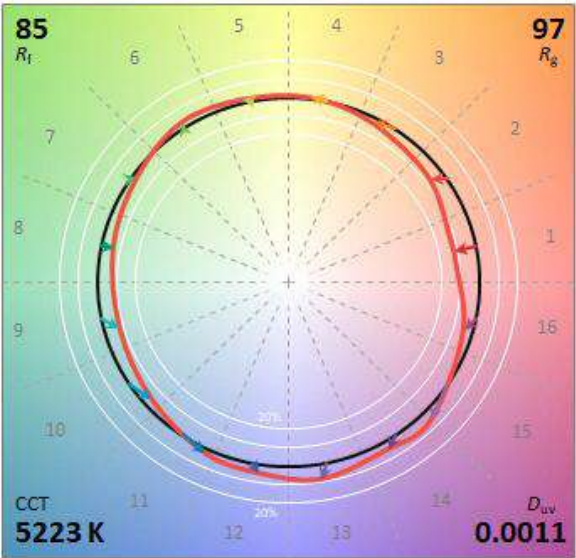
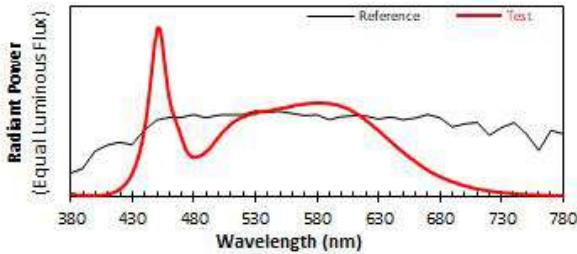
ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-50E-11M-3CA

Date: 2023/9/7

Manufacturer: IK10 LED LIGHTING

Model: IK-HBAX-0100-50-DY-RLHV02BI



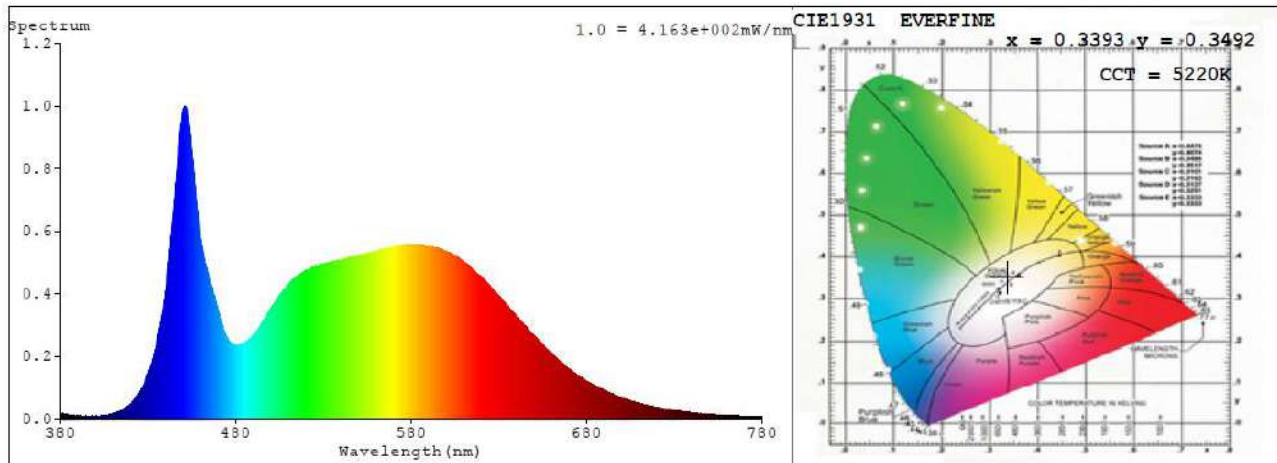
Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.3393
y 0.3491
u' 0.2085
v' 0.4826

CIE 13.3-1995 (CRI)
Ra 85
R9 16

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



nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.0163	414	0.025	448	0.9084	482	0.2376	516	0.4576
381	0.0192	415	0.0268	449	0.9388	483	0.2381	517	0.462
382	0.0145	416	0.0323	450	0.9909	484	0.2394	518	0.4682
383	0.0161	417	0.0354	451	0.9995	485	0.2443	519	0.4717
384	0.0149	418	0.0404	452	0.9938	486	0.2453	520	0.473
385	0.0108	419	0.0443	453	0.9634	487	0.2508	521	0.4735
386	0.01	420	0.0502	454	0.9128	488	0.2567	522	0.479
387	0.0094	421	0.0552	455	0.8555	489	0.2598	523	0.4816
388	0.0127	422	0.061	456	0.7926	490	0.2683	524	0.4832
389	0.0117	423	0.0689	457	0.7312	491	0.275	525	0.4862
390	0.0097	424	0.0754	458	0.6759	492	0.2803	526	0.4872
391	0.0089	425	0.0827	459	0.62	493	0.2887	527	0.4907
392	0.0098	426	0.0962	460	0.5772	494	0.2986	528	0.4965
393	0.0076	427	0.103	461	0.5466	495	0.3064	529	0.4921
394	0.01	428	0.1164	462	0.5134	496	0.3174	530	0.4965
395	0.01	429	0.1295	463	0.4915	497	0.3272	531	0.4954
396	0.0097	430	0.1446	464	0.4695	498	0.3335	532	0.4989
397	0.0086	431	0.1626	465	0.4525	499	0.3454	533	0.5016
398	0.0073	432	0.1775	466	0.4284	500	0.3532	534	0.502
399	0.0085	433	0.1995	467	0.4103	501	0.3616	535	0.5032
400	0.0098	434	0.2206	468	0.3909	502	0.3725	536	0.5034
401	0.0094	435	0.2468	469	0.3681	503	0.3807	537	0.5012
402	0.0101	436	0.2733	470	0.3458	504	0.388	538	0.5074
403	0.0099	437	0.3028	471	0.3247	505	0.3965	539	0.5081
404	0.0106	438	0.3357	472	0.3078	506	0.401	540	0.5079
405	0.0121	439	0.3759	473	0.2865	507	0.4101	541	0.5097
406	0.0122	440	0.4168	474	0.2718	508	0.416	542	0.509
407	0.0132	441	0.4621	475	0.2614	509	0.424	543	0.5115
408	0.0141	442	0.5185	476	0.2505	510	0.4304	544	0.5139
409	0.015	443	0.5758	477	0.2435	511	0.4354	545	0.5154
410	0.017	444	0.6423	478	0.2371	512	0.4428	546	0.5181
411	0.0185	445	0.7042	479	0.2387	513	0.4464	547	0.5185
412	0.0202	446	0.7752	480	0.2343	514	0.4517	548	0.5186
413	0.0231	447	0.8405	481	0.2347	515	0.4563	549	0.5198

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
550	0.5214	599	0.5381	648	0.2777	697	0.074	746	0.0175
551	0.5243	600	0.5351	649	0.2723	698	0.0722	747	0.0163
552	0.5258	601	0.5331	650	0.267	699	0.07	748	0.0162
553	0.526	602	0.5314	651	0.2601	700	0.0681	749	0.0159
554	0.527	603	0.5281	652	0.2551	701	0.0654	750	0.015
555	0.5261	604	0.5234	653	0.2467	702	0.0635	751	0.0154
556	0.5326	605	0.5217	654	0.2425	703	0.0631	752	0.0143
557	0.5307	606	0.5185	655	0.2368	704	0.0601	753	0.0143
558	0.5347	607	0.5161	656	0.2304	705	0.0586	754	0.0138
559	0.5343	608	0.5108	657	0.2259	706	0.056	755	0.0134
560	0.5359	609	0.5059	658	0.2218	707	0.0546	756	0.0131
561	0.5378	610	0.5017	659	0.2154	708	0.053	757	0.013
562	0.5409	611	0.4973	660	0.2104	709	0.0515	758	0.0123
563	0.5417	612	0.4946	661	0.2047	710	0.0492	759	0.012
564	0.5415	613	0.4887	662	0.1986	711	0.0481	760	0.0117
565	0.5432	614	0.4847	663	0.1953	712	0.0474	761	0.0113
566	0.5441	615	0.4791	664	0.1882	713	0.0456	762	0.0112
567	0.5451	616	0.4758	665	0.1835	714	0.0444	763	0.0111
568	0.5476	617	0.4676	666	0.1788	715	0.0428	764	0.0112
569	0.5461	618	0.4647	667	0.1735	716	0.0412	765	0.0108
570	0.5496	619	0.4583	668	0.1686	717	0.0404	766	0.0102
571	0.5491	620	0.451	669	0.1643	718	0.0398	767	0.0101
572	0.5504	621	0.4474	670	0.1591	719	0.038	768	0.0098
573	0.5507	622	0.4412	671	0.155	720	0.037	769	0.0096
574	0.5544	623	0.4348	672	0.1502	721	0.0359	770	0.0094
575	0.5531	624	0.4285	673	0.1477	722	0.0345	771	0.0091
576	0.5526	625	0.425	674	0.1416	723	0.0337	772	0.0089
577	0.555	626	0.4178	675	0.1377	724	0.0331	773	0.0086
578	0.5546	627	0.4091	676	0.1352	725	0.0315	774	0.0078
579	0.554	628	0.4044	677	0.1327	726	0.0309	775	0.0077
580	0.5545	629	0.3997	678	0.1282	727	0.0294	776	0.0078
581	0.5557	630	0.3932	679	0.1243	728	0.0288	777	0.0075
582	0.5536	631	0.3871	680	0.1207	729	0.0273	778	0.0075
583	0.5549	632	0.381	681	0.1176	730	0.0268	779	0.0075
584	0.5562	633	0.3743	682	0.1159	731	0.0261	780	0.0075
585	0.5549	634	0.3666	683	0.1111	732	0.0257		
586	0.5537	635	0.3613	684	0.1087	733	0.025		
587	0.5538	636	0.3531	685	0.1058	734	0.024		
588	0.5524	637	0.3473	686	0.1022	735	0.0237		
589	0.5533	638	0.3409	687	0.0999	736	0.0227		
590	0.5517	639	0.3343	688	0.0968	737	0.0224		
591	0.5493	640	0.3289	689	0.0943	738	0.0213		
592	0.5491	641	0.3223	690	0.0906	739	0.0208		
593	0.5489	642	0.315	691	0.0891	740	0.0201		
594	0.5476	643	0.3099	692	0.0865	741	0.0198		
595	0.5434	644	0.3037	693	0.0841	742	0.0188		
596	0.5447	645	0.2962	694	0.0815	743	0.0189		
597	0.5427	646	0.2895	695	0.0794	744	0.0179		
598	0.5391	647	0.2833	696	0.0766	745	0.0177		

6. Goniophotometer Test results

6.1 Test Data

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

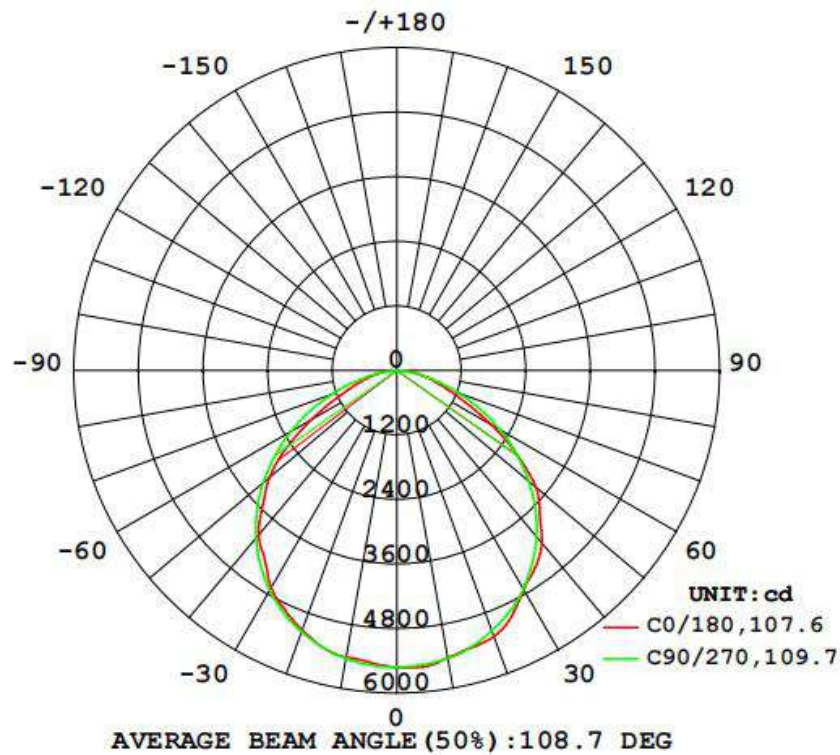
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current(A)	Power Factor	Power(W)
277.2	60	0.3612	0.9983	99.92

Optical Measurement

Luminous Flux (lm)	Efficacy(lm/W)	Imax (cd)	ZL (20-50°)
14804.5	148.16	5533	53.1%

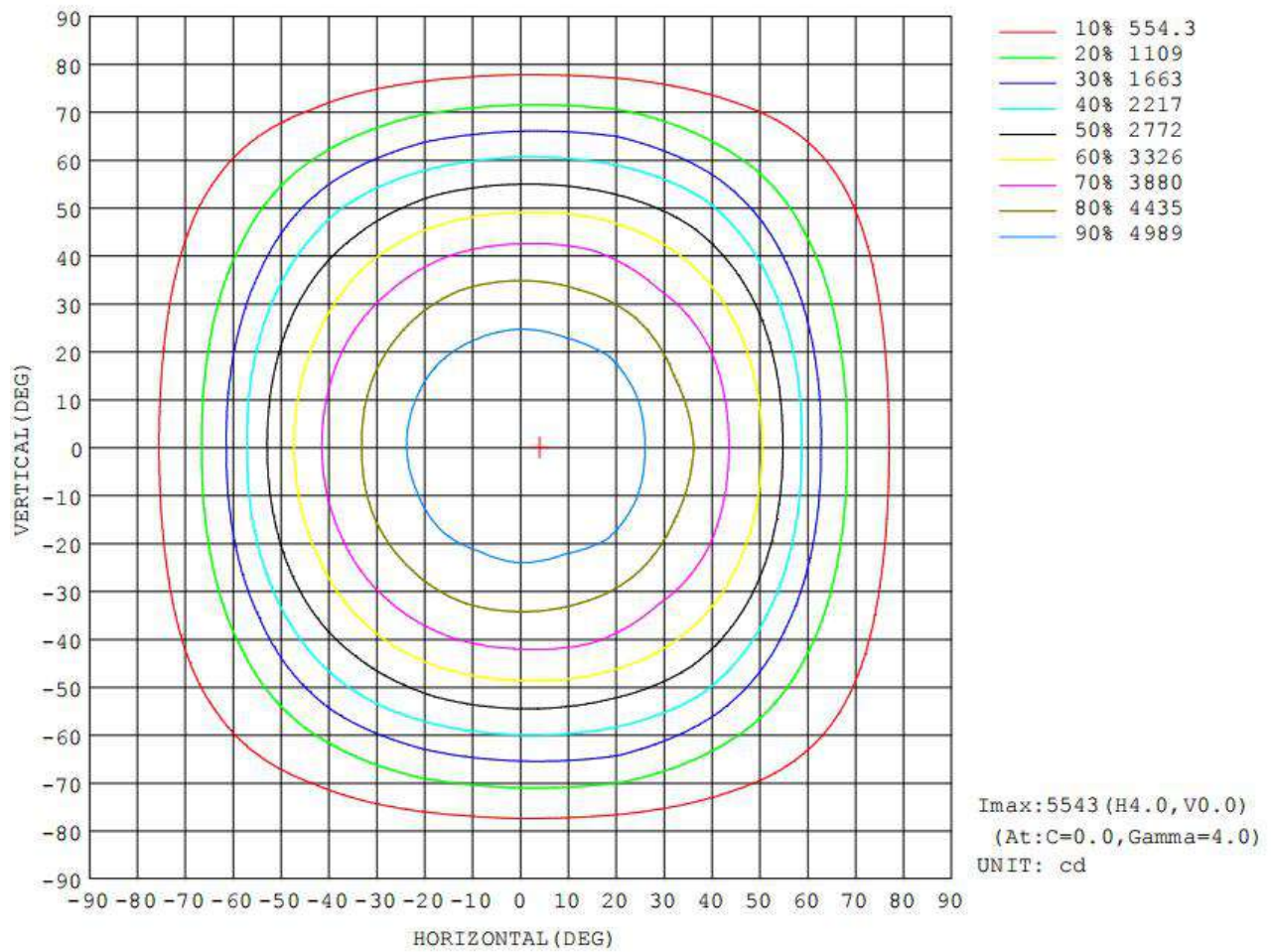
6.2 Luminous Intensity Distribution



6.3 Zonal Flux Diagram

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum, lamp
10	5424	5465	5437	5378	5414	5385	5440	5475	0- 10	522.3	522.3	3.53,3.53
20	5267	5175	5153	5174	5139	5178	5173	5177	10- 20	1503	2026	13.7,13.7
30	4717	4801	4701	4660	4671	4685	4722	4828	20- 30	2292	4318	29.2,29.2
40	4193	4052	4041	3995	3993	4019	4075	4083	30- 40	2755	7073	47.8,47.8
50	3374	3321	3201	3126	3093	3159	3239	3353	40- 50	2822	9895	66.8,66.8
60	2034	2282	2221	2078	1844	2130	2281	2346	50- 60	2413	12308	83.1,83.1
70	964.9	1084	1209	976.0	854.5	1002	1256	1123	60- 70	1558	13866	93.7,93.7
80	415.0	394.1	375.0	331.9	355.1	349.1	397.3	409.8	70- 80	729.0	14595	98.6,98.6
90	66.35	14.97	7.282	8.350	0.9554	1.012	3.483	3.093	80- 90	187.6	14782	99.8,99.8
100	1.479	1.821	1.551	1.613	1.993	2.528	2.531	2.387	90-100	2.854	14785	99.9,99.9
110	1.720	1.927	2.221	1.861	2.559	2.746	3.107	2.531	100-110	2.228	14787	99.9,99.9
120	2.415	2.539	3.111	2.610	2.759	2.924	3.364	2.736	110-120	2.474	14790	99.9,99.9
130	3.401	3.511	4.163	3.593	3.626	3.766	4.027	3.623	120-130	2.810	14793	99.9,99.9
140	4.526	4.244	4.701	4.222	5.341	4.972	4.436	4.961	130-140	3.262	14796	99.9,99.9
150	5.052	4.740	5.067	4.674	6.781	7.129	5.852	6.719	140-150	3.281	14799	100,100
160	5.581	5.330	5.012	5.496	7.815	7.965	7.608	7.395	150-160	2.862	14802	100,100
170	5.917	6.160	6.029	6.410	7.367	7.026	7.693	7.132	160-170	1.852	14804	100,100
180	7.919	7.655	7.738	7.826	7.666	6.904	7.552	7.760	170-180	0.6653	14805	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	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516	5516			
5	5530	5527	5519	5503	5493	5478	5464	5455	5455	5458	5469	5486	5502	5510	5525	5532			
10	5424	5429	5465	5463	5437	5403	5378	5396	5414	5404	5385	5408	5440	5471	5475	5442			
15	5336	5320	5312	5363	5327	5277	5313	5328	5330	5335	5320	5279	5327	5365	5320	5326			
20	5267	5243	5175	5177	5153	5108	5174	5140	5139	5149	5178	5129	5173	5202	5177	5250			
25	5046	5065	5028	4942	4952	4926	4931	4920	4921	4929	4949	4963	4977	4976	5038	5076			
30	4717	4734	4801	4694	4701	4702	4660	4676	4671	4683	4685	4728	4722	4718	4828	4749			
35	4485	4438	4448	4408	4389	4389	4356	4309	4285	4313	4378	4425	4424	4431	4484	4441			
40	4193	4177	4052	4100	4041	4025	3995	3963	3993	3981	4019	4060	4075	4122	4083	4188			
45	3757	3744	3712	3718	3641	3608	3523	3548	3519	3573	3560	3650	3677	3752	3734	3770			
50	3374	3346	3321	3266	3201	3171	3126	3057	3093	3087	3159	3213	3239	3311	3353	3365			
55	2735	2782	2811	2751	2726	2687	2577	2537	2504	2567	2632	2739	2766	2805	2841	2821			
60	2034	2105	2282	2261	2221	2157	2078	1885	1844	1924	2130	2213	2281	2312	2346	2162			
65	1400	1451	1638	1770	1709	1639	1492	1296	1256	1329	1530	1703	1766	1823	1704	1498			
70	965	984	1084	1243	1209	1144	976	861	855	880	1002	1183	1256	1294	1123	1009			
75	655	656	678	751	751	700	596	567	576	583	617	731	785	792	704	674			
80	415	408	394	386	375	347	332	339	355	353	349	369	397	409	410	421			
85	228	215	182	142	122	121	134	153	172	166	147	131	128	154	192	226			
90	66.4	60.0	15.0	16.3	7.28	4.97	8.35	6.00	0.96	0.96	1.01	1.34	3.48	4.18	3.09	33.8			
95	0.72	0.81	0.89	1.86	1.07	1.23	1.35	0.85	1.30	1.44	1.62	2.20	1.87	2.17	1.44	1.32			
100	1.48	1.63	1.82	1.42	1.55	1.24	1.61	1.59	1.99	2.26	2.53	2.26	2.53	2.14	2.39	2.24			
105	1.45	1.76	1.78	1.60	1.84	1.49	1.67	1.79	2.38	2.54	2.66	2.54	2.94	2.40	2.45	2.40			
110	1.72	1.99	1.93	1.89	2.22	1.81	1.86	2.05	2.56	2.77	2.75	2.67	3.11	2.56	2.53	2.56			
115	2.03	2.21	2.18	2.25	1.78	2.23	2.16	2.25	2.66	2.81	2.79	2.80	2.10	2.70	2.59	2.62			
120	2.41	2.51	2.54	2.69	3.11	2.54	2.61	2.58	2.76	2.89	2.92	2.92	3.36	2.84	2.74	2.70			
125	2.90	2.92	3.02	3.10	3.61	3.12	3.05	3.07	3.08	3.19	3.21	3.12	3.34	3.04	3.08	3.04			
130	3.40	3.39	3.51	3.68	4.16	3.65	3.59	3.66	3.63	3.77	3.77	3.99	4.03	3.82	3.62	3.61			
135	3.95	3.87	3.94	4.25	3.61	4.32	3.91	4.11	4.42	4.54	4.44	4.65	4.75	4.54	4.35	4.41			
140	4.53	4.44	4.24	4.35	4.70	4.22	4.22	4.56	5.34	5.39	4.97	4.64	4.44	4.54	4.96	5.37			
145	4.90	4.76	4.67	4.32	4.93	4.64	4.78	4.73	6.16	6.00	6.09	5.37	6.02	5.37	6.12	6.11			
150	5.05	5.09	4.74	4.30	5.07	4.51	4.67	5.20	6.78	6.97	7.13	6.35	5.85	6.10	6.72	6.99			
155	5.50	5.64	5.04	4.85	4.59	5.04	4.97	5.71	7.62	7.45	7.77	7.41	6.92	6.59	6.98	7.69			
160	5.58	5.72	5.33	4.87	5.01	5.12	5.50	5.76	7.81	7.81	7.96	7.61	7.61	7.64	7.39	7.59			
165	5.29	5.41	5.72	5.77	5.36	5.99	5.85	5.46	7.53	7.45	6.93	7.63	7.59	6.94	7.53	7.50			
170	5.92	5.99	6.16	5.89	6.03	6.51	6.41	6.04	7.37	7.33	7.03	7.11	7.69	7.05	7.13	7.13			
175	6.78	6.72	6.64	6.62	6.77	7.16	7.10	6.85	7.34	7.35	7.68	7.58	7.20	7.10	7.20	7.24			
180	7.92	7.02	7.65	7.56	7.74	7.79	7.83	6.94	7.67	7.65	6.90	7.60	7.55	7.67	7.76	7.81			

7. THD and PF Test

Model Number	Voltage (V AC)	Frequency (Hz)	Power Factor	THD (%)
IK-HBAX-0100-50-DY-RLHV02BI	277.0	60	0.998	4.39
	480.0	60	0.942	13.36

8. Photo of sample



Figure 1



Figure 2

---End of Report---