

TEST REPORT OF ANSI/IES LM-79-19

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

Client : IKIO LED LIGHTING

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

Test Model IK-HBAX-0240-50-DY-RLV04BX

Brand Name IKIO

Testing Laboratory Guangdong Meide Testing Technology Co., Ltd.

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Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr., China

Testing location As above

Report No. N02A22060550L00401

Date of receipt June 20,2022

Date of test June 20,2022- July 09, 2022

Date of report July 09, 2022

Tested by:

Jarvis Zhang

Jarvis Zhang/ Test Engineer

Checked by:

Sandy Chen

Sandy Chen/ Project Engineer

Approved by:

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.

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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-0240-50-DY-RLV04BX
Model No.:	IK-HBAX-0240-50-DY-RLV04BX
Manufacturer:	IKIO LED LIGHTING
Product Type:	High Bay Luminaires for Commercial and Industrial Buildings
Rated Voltage/Frequency:	100-277V AC, 50/60Hz
Rated Power:	240W
Rated luminous flux:	36000lm
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	2022/09/17
Digital Power Meter	MD-E001	PF2010	2022/09/17
AC Testing Power Source	MD-E002	DPS1060	2022/09/17
Total Spectral Radiant Flux Standard Lamp	MD-E007	D908S	2022/10/13
Integrating Sphere System	MD-E029	2M	2022/09/17
High Accuracy Array Spectroradio Meter	MD-E011	HAAS-3000	2022/09/17
Digital Power Meter	MD-E008	PF310	2022/09/17
AC Testing Power Source	MD-E010	DPS1010	2022/09/17
Standard Lamp	MD-E036	D204	2022/10/13

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)	25.1°C	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)
119.84	60	1.977	236.3	0.9977	33896	143.43	4974

Ra	R9	Rf	Rg	x	y	u'	v'	Duv
84	12	84	95	0.3461	0.3549	0.2108	0.4864	1.25E-03

5.2 Color Rendering Index

Ra
84

R1
82

R2
91

R3
95

R4
81

R5
82

R6
85

R7
87

R8
68

R9
12

R10
77

R11
80

R12
59

R13
85

R14
98

R15
77



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

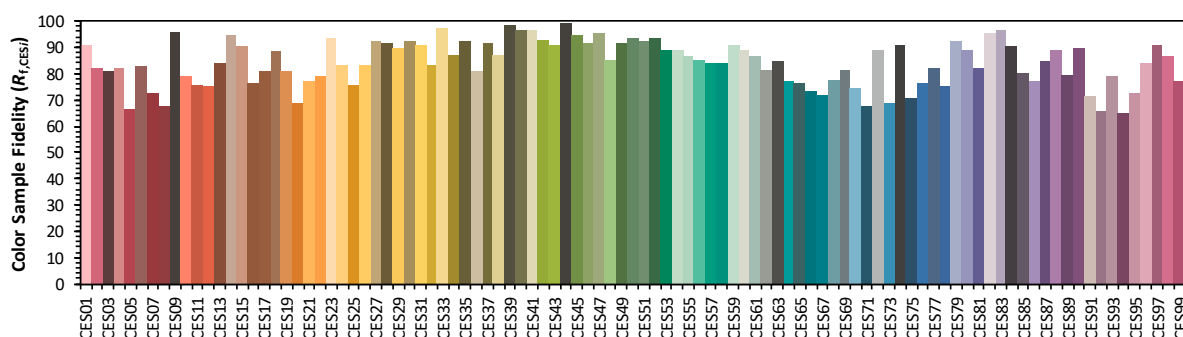
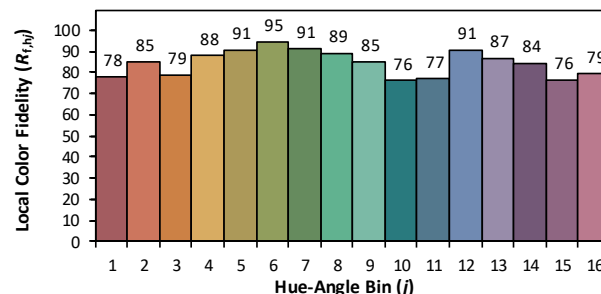
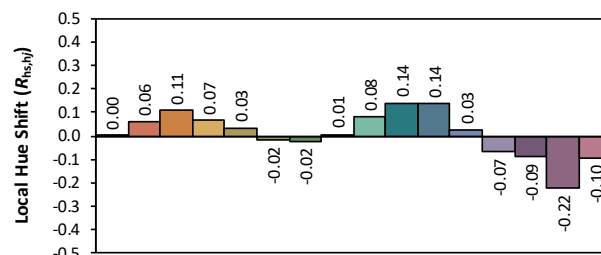
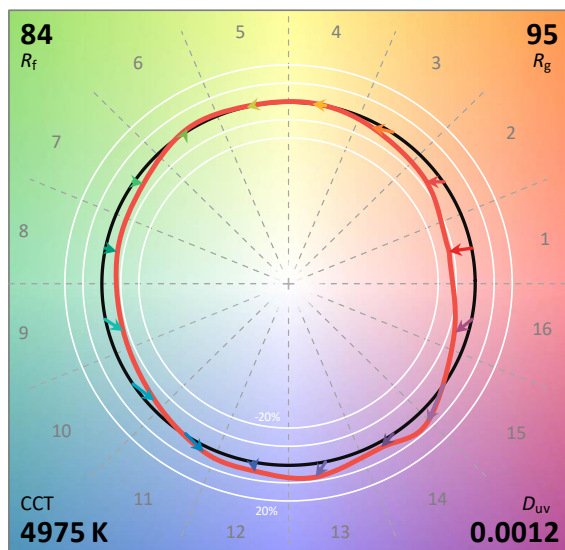
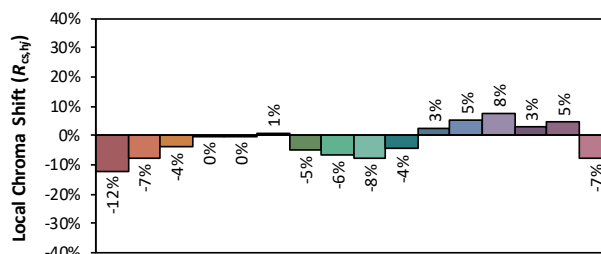
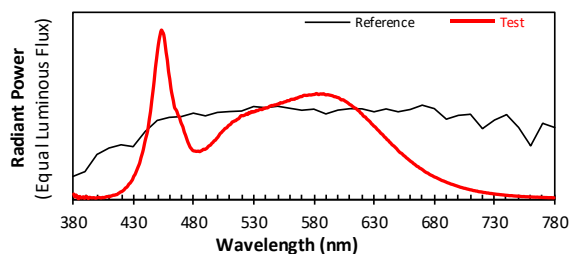
ANSI/IES TM-30-18 Color Rendition Report

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

Manufacturer: IKIO LED LIGHTING

Date: 2022/7/8

Model: IK-HBAX-0240-50-DY-RLV04BX



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

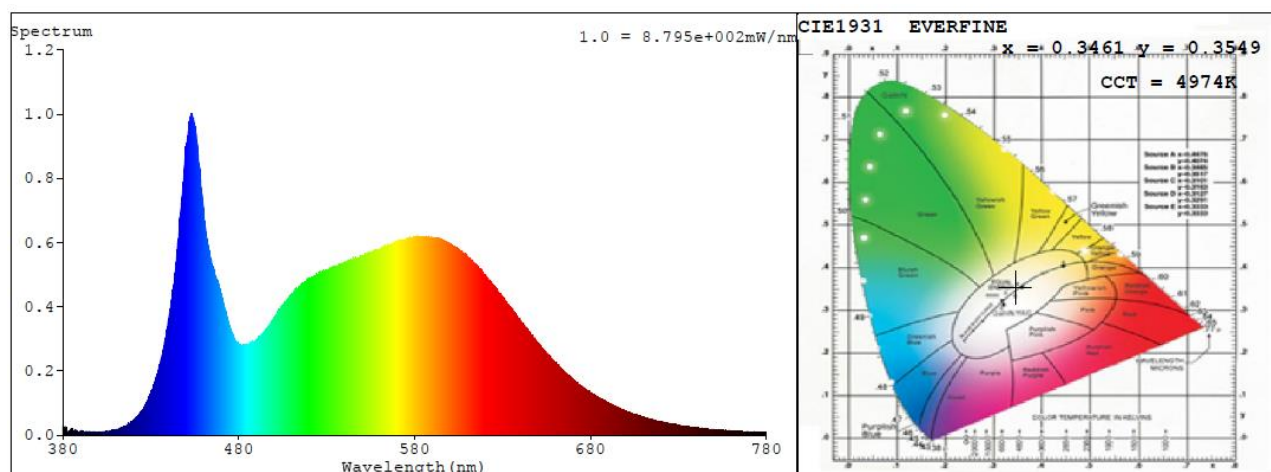
x 0.3460
 y 0.3548
 u' 0.2108
 v' 0.4863

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.

5.4 Relative Spectral Power Distribution



nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.03	414	0.023	448	0.7661	482	0.2802	516	0.4673
381	0.013	415	0.0261	449	0.8225	483	0.2806	517	0.4703
382	0.0241	416	0.0267	450	0.8803	484	0.2813	518	0.4766
383	0.0117	417	0.0325	451	0.9281	485	0.2784	519	0.4868
384	0.0025	418	0.0367	452	0.9641	486	0.283	520	0.49
385	0.0157	419	0.0422	453	0.9908	487	0.286	521	0.489
386	0.0077	420	0.0442	454	0.9802	488	0.2926	522	0.4916
387	0.0085	421	0.0494	455	0.9644	489	0.2911	523	0.4948
388	0.0137	422	0.0551	456	0.9167	490	0.2947	524	0.5008
389	0.0046	423	0.0645	457	0.8594	491	0.2995	525	0.4967
390	0.0139	424	0.0689	458	0.8146	492	0.3082	526	0.5082
391	0.0141	425	0.0769	459	0.7477	493	0.3137	527	0.5046
392	0.0036	426	0.0884	460	0.7045	494	0.3175	528	0.5133
393	0.0104	427	0.0942	461	0.6484	495	0.3271	529	0.5099
394	0.0092	428	0.1045	462	0.6101	496	0.3327	530	0.5138
395	0.0077	429	0.115	463	0.5767	497	0.342	531	0.5129
396	0.0083	430	0.1334	464	0.5373	498	0.3457	532	0.5201
397	0.0083	431	0.1437	465	0.5262	499	0.3553	533	0.5185
398	0.0063	432	0.1603	466	0.5135	500	0.3628	534	0.5222
399	0.0069	433	0.1779	467	0.4913	501	0.3736	535	0.5255
400	0.0094	434	0.1951	468	0.4816	502	0.3846	536	0.5262
401	0.0098	435	0.2131	469	0.456	503	0.3903	537	0.5252
402	0.0084	436	0.2417	470	0.4381	504	0.3987	538	0.5316
403	0.0075	437	0.265	471	0.4227	505	0.4054	539	0.5315
404	0.01	438	0.2914	472	0.3956	506	0.4139	540	0.5358
405	0.0089	439	0.3267	473	0.3777	507	0.4168	541	0.5348
406	0.0107	440	0.3569	474	0.3569	508	0.423	542	0.5377
407	0.0135	441	0.3829	475	0.3361	509	0.4321	543	0.5435
408	0.0152	442	0.4183	476	0.3202	510	0.436	544	0.5465
409	0.0148	443	0.4699	477	0.3043	511	0.4417	545	0.5493
410	0.0143	444	0.5144	478	0.2958	512	0.452	546	0.5488
411	0.0184	445	0.5758	479	0.2868	513	0.4543	547	0.5517
412	0.0202	446	0.6319	480	0.2829	514	0.4589	548	0.553
413	0.0233	447	0.6931	481	0.282	515	0.4605	549	0.5541

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
550	0.5579	599	0.5976	648	0.3025	697	0.0824	746	0.0191
551	0.5571	600	0.5957	649	0.2956	698	0.0799	747	0.0186
552	0.5651	601	0.5933	650	0.2864	699	0.0777	748	0.018
553	0.5646	602	0.5872	651	0.2788	700	0.0751	749	0.0176
554	0.5648	603	0.5817	652	0.2722	701	0.0728	750	0.0173
555	0.5687	604	0.5829	653	0.2689	702	0.07	751	0.017
556	0.5708	605	0.5802	654	0.2622	703	0.0684	752	0.0161
557	0.5727	606	0.575	655	0.2552	704	0.0664	753	0.0151
558	0.5776	607	0.571	656	0.2505	705	0.0641	754	0.0148
559	0.5768	608	0.5662	657	0.243	706	0.0632	755	0.0154
560	0.5796	609	0.5607	658	0.2379	707	0.061	756	0.0142
561	0.5853	610	0.5546	659	0.2317	708	0.0591	757	0.014
562	0.5847	611	0.5516	660	0.226	709	0.0576	758	0.0139
563	0.5865	612	0.5454	661	0.22	710	0.0554	759	0.0134
564	0.5857	613	0.5399	662	0.2159	711	0.0543	760	0.0133
565	0.5918	614	0.5349	663	0.2086	712	0.0525	761	0.0128
566	0.5914	615	0.5321	664	0.2043	713	0.0501	762	0.0125
567	0.5961	616	0.5256	665	0.1982	714	0.0496	763	0.012
568	0.5985	617	0.5196	666	0.1923	715	0.0474	764	0.0119
569	0.6018	618	0.5143	667	0.1899	716	0.0472	765	0.0113
570	0.6012	619	0.5047	668	0.1828	717	0.0444	766	0.0121
571	0.6064	620	0.5005	669	0.1796	718	0.0433	767	0.0111
572	0.609	621	0.49	670	0.1751	719	0.0427	768	0.0109
573	0.6086	622	0.4836	671	0.1701	720	0.0416	769	0.0109
574	0.6082	623	0.4811	672	0.164	721	0.04	770	0.0102
575	0.6092	624	0.4713	673	0.1591	722	0.0388	771	0.01
576	0.6114	625	0.4655	674	0.155	723	0.0382	772	0.0097
577	0.6108	626	0.4592	675	0.1527	724	0.0361	773	0.0094
578	0.611	627	0.4523	676	0.1471	725	0.0362	774	0.0093
579	0.6127	628	0.4425	677	0.1428	726	0.0345	775	0.0087
580	0.6136	629	0.4365	678	0.1395	727	0.0333	776	0.0086
581	0.6149	630	0.4283	679	0.1363	728	0.0331	777	0.0087
582	0.6192	631	0.4238	680	0.1317	729	0.0317	778	0.0087
583	0.6169	632	0.416	681	0.1287	730	0.0307	779	0.0081
584	0.6129	633	0.4076	682	0.1261	731	0.0298	780	0.008
585	0.616	634	0.4015	683	0.1225	732	0.0288		
586	0.6171	635	0.3935	684	0.119	733	0.028		
587	0.6155	636	0.3853	685	0.1156	734	0.0275		
588	0.6181	637	0.3805	686	0.1118	735	0.0264		
589	0.6144	638	0.3724	687	0.1085	736	0.0259		
590	0.6116	639	0.3639	688	0.1067	737	0.025		
591	0.6123	640	0.3588	689	0.1035	738	0.0245		
592	0.6123	641	0.3489	690	0.1007	739	0.0235		
593	0.6103	642	0.3451	691	0.0972	740	0.0227		
594	0.6089	643	0.3353	692	0.0948	741	0.0223		
595	0.6072	644	0.3294	693	0.0923	742	0.0214		
596	0.6049	645	0.3205	694	0.089	743	0.0204		
597	0.6008	646	0.315	695	0.087	744	0.0204		
598	0.6007	647	0.3096	696	0.0851	745	0.0204		

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

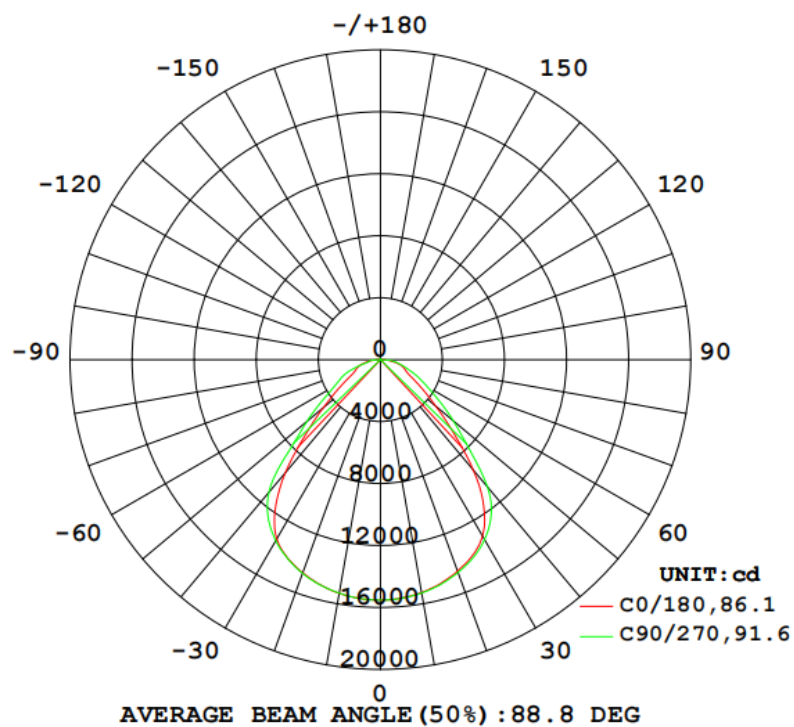
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current(A)	Power Factor	Power(W)
119.9	60	1.9825	0.9985	237.5

Optical Measurement

Luminous Flux (lm)	Efficacy(lm/W)	Imax (cd)	ZL (20-50°)
33814	142.39	15529	58.7%

6.2 Luminous Intensity Distribution

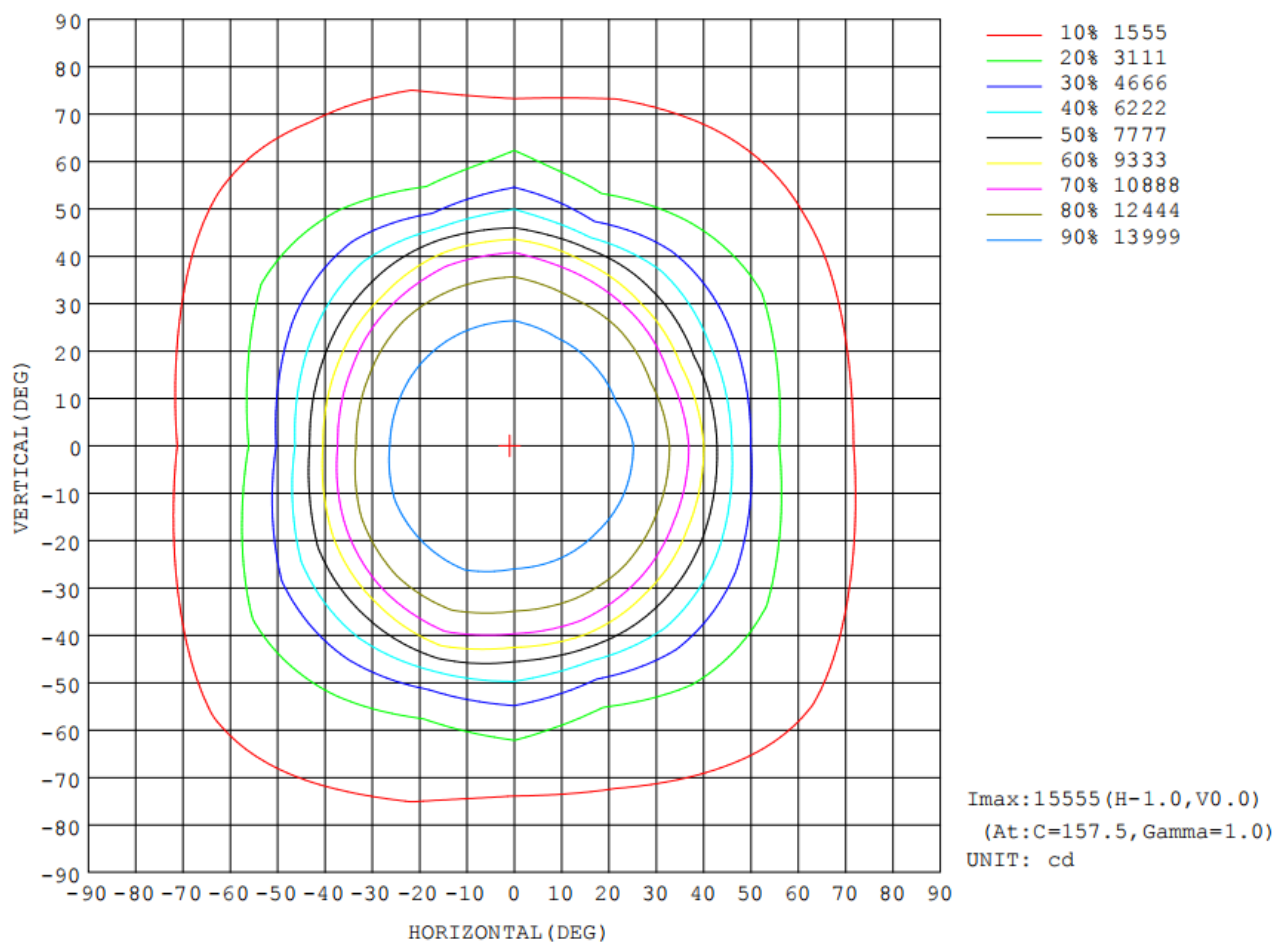




6.3 Zonal Flux Diagram

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	Φ lum, lamp
10	1526	1528	1530	1540	1532	1532	1530	1521	0- 10	1471	1471	4.35, 4.35
20	1453	1455	1462	1482	1464	1463	1468	1445	10- 20	4242	5713	16.9, 16.9
30	1316	1326	1342	1370	1337	1341	1350	1304	20- 30	6489	12202	36.1, 36.1
40	933.1	971.6	1074	1102	954.5	1002	1120	899.5	30- 40	7502	19704	58.3, 58.3
50	463.9	558.9	613.1	636.1	475.9	571.9	617.9	501.3	40- 50	5861	25565	75.6, 75.6
60	236.5	305.1	348.9	338.1	237.9	293.8	342.2	267.6	50- 60	3587	29152	86.2, 86.2
70	163.0	190.8	198.2	204.5	161.8	194.1	212.2	182.8	60- 70	2318	31470	93.1, 93.1
80	88.17	104.9	107.5	121.7	88.64	107.0	77.53	90.72	70- 80	1535	33004	97.6, 97.6
90	4.939	5.104	1.519	25.07	5.586	5.420	2.301	4.187	80- 90	597.7	33602	99.4, 99.4
100	2.920	0.6840	1.520	2.156	3.729	0.8419	1.709	0.5859	90-100	35.97	33638	99.5, 99.5
110	1.372	2.743	1.896	2.426	0.4639	2.605	2.138	2.634	100-110	14.84	33653	99.5, 99.5
120	3.903	3.355	2.986	3.380	4.349	3.812	2.775	3.345	110-120	29.64	33683	99.6, 99.6
130	4.209	3.924	2.921	4.180	5.111	4.409	3.262	3.886	120-130	33.83	33716	99.7, 99.7
140	4.447	4.364	3.267	4.392	5.291	4.701	3.388	4.393	130-140	33.54	33750	99.8, 99.8
150	4.510	4.647	3.280	4.730	5.111	5.259	3.571	4.730	140-150	28.81	33779	99.9, 99.9
160	4.539	3.924	3.004	4.061	4.910	4.842	2.793	4.241	150-160	20.59	33799	100, 100
170	3.996	3.640	2.958	4.208	4.111	4.292	3.827	4.447	160-170	11.02	33810	100, 100
180	3.957	4.546	2.948	4.190	3.948	4.089	3.974	3.813	170-180	3.559	33814	100, 100
DEG	LUMINOUS INTENSITY: X10cd									UNIT: lm		

6.4 Isocandela Diagram



6.5 Luminous Distribution Intensity Data

Table--1

UNIT: X10cd

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	1552	1552	1552	1552	1552	1552	1552	1552	1552	1552	1552	1552	1552	1552	1552	1552			
5	1545	1545	1545	1545	1546	1551	1550	1551	1548	1548	1548	1547	1547	1544	1542	1542			
10	1526	1527	1528	1528	1530	1540	1540	1539	1532	1533	1532	1531	1530	1524	1521	1520			
15	1496	1497	1497	1499	1502	1518	1517	1516	1503	1505	1504	1504	1505	1494	1489	1486			
20	1453	1454	1455	1459	1462	1483	1482	1480	1464	1463	1463	1467	1468	1452	1445	1441			
25	1399	1400	1399	1406	1411	1438	1434	1434	1415	1411	1412	1414	1417	1393	1386	1381			
30	1316	1321	1326	1334	1342	1375	1370	1369	1337	1337	1341	1344	1350	1314	1304	1288			
35	1163	1171	1208	1231	1242	1287	1282	1258	1185	1199	1234	1249	1259	1203	1171	1120			
40	933	933	972	1046	1074	1149	1102	1043	954	964	1002	1096	1120	995	899	859			
45	664	719	746	767	803	903	838	811	681	720	760	819	833	701	686	645			
50	464	530	559	518	613	614	636	622	476	532	572	524	618	452	501	480			
55	331	404	406	365	462	427	459	466	335	400	396	354	452	320	351	375			
60	236	314	305	257	349	304	338	362	238	318	294	247	342	229	268	295			
65	186	246	236	199	270	226	256	277	186	251	238	189	280	190	225	236			
70	163	197	191	172	198	187	205	212	162	201	194	179	212	187	183	174			
75	135	154	149	147	145	163	165	165	131	144	150	168	125	148	136	119			
80	88.2	109	105	98.2	107	123	122	122	88.6	97.8	107	97.3	77.5	75.0	90.7	87.6			
85	52.2	62.8	60.9	52.3	61.9	70.5	77.2	80.4	53.0	59.2	60.5	49.6	57.4	32.7	38.4	40.8			
90	4.94	5.89	5.10	3.45	1.52	20.7	25.1	26.9	5.59	6.24	5.42	3.75	2.30	2.48	4.19	4.96			
95	4.18	3.99	3.24	1.34	1.31	2.30	3.67	4.44	4.17	4.17	3.51	1.49	1.68	1.60	2.83	4.21			
100	2.92	0.67	0.68	1.79	1.52	1.21	2.16	3.69	3.73	3.32	0.84	1.42	1.71	1.61	0.59	0.38			
105	0.91	0.45	1.35	1.51	1.91	1.86	0.47	0.38	0.36	0.54	0.58	1.66	2.03	1.44	2.27	0.68			
110	1.37	2.93	2.74	1.72	1.90	1.86	2.43	0.50	0.46	1.59	2.61	1.99	2.14	1.72	2.63	4.46			
115	3.81	3.50	3.08	2.20	2.20	2.31	2.95	3.65	3.91	3.95	3.31	2.49	2.30	2.15	3.03	3.90			
120	3.90	3.62	3.36	3.01	2.99	2.99	3.38	3.81	4.35	4.21	3.81	3.21	2.77	2.96	3.34	4.14			
125	3.99	3.80	3.64	3.16	2.83	3.14	3.81	3.99	4.67	4.61	4.11	3.77	3.25	3.37	3.56	4.37			
130	4.21	4.05	3.92	3.62	2.92	4.02	4.18	4.27	5.11	5.02	4.41	4.29	3.26	3.87	3.89	4.60			
135	4.36	4.27	4.23	4.24	3.13	4.24	4.53	4.49	5.27	5.19	4.67	4.67	3.27	4.50	4.02	4.66			
140	4.45	4.48	4.36	4.50	3.27	4.33	4.39	4.69	5.29	5.24	4.70	4.78	3.39	5.05	4.39	4.60			
145	4.45	4.44	4.59	4.24	3.34	4.03	4.72	4.76	5.25	5.19	5.25	4.82	3.53	6.16	4.68	4.70			
150	4.51	4.61	4.65	4.60	3.28	4.14	4.73	4.50	5.11	5.15	5.26	4.90	3.57	4.80	4.73	4.83			
155	4.60	4.66	4.60	4.43	3.14	4.70	4.72	4.46	5.16	5.09	5.20	4.95	3.22	3.62	4.25	4.83			
160	4.54	4.37	3.92	3.36	3.00	3.95	4.06	4.38	4.91	4.88	4.84	5.03	2.79	3.31	4.24	4.09			
165	3.76	3.86	4.24	3.32	3.21	3.37	4.23	3.48	3.79	3.81	4.09	4.81	3.28	3.12	3.82	4.25			
170	4.00	3.94	3.64	3.93	2.96	3.58	4.21	3.71	4.11	4.12	4.29	4.24	3.83	2.95	4.45	3.77			
175	3.39	3.77	4.45	3.96	2.90	3.77	3.83	3.18	3.43	3.41	3.69	4.53	3.88	2.92	4.07	4.18			
180	3.96	4.07	4.55	3.96	2.95	3.76	4.19	3.68	3.95	3.98	4.09	4.56	3.97	2.93	3.81	4.18			

7. THD and PF Test

Model Number	Voltage (V AC)	Frequency (Hz)	Power Factor	THD (%)
IK-HBAX-0240-50-DY-RLV04BX	120.0	60	0.998	3.5
	277.0	60	0.945	8.35

8. Photo of sample

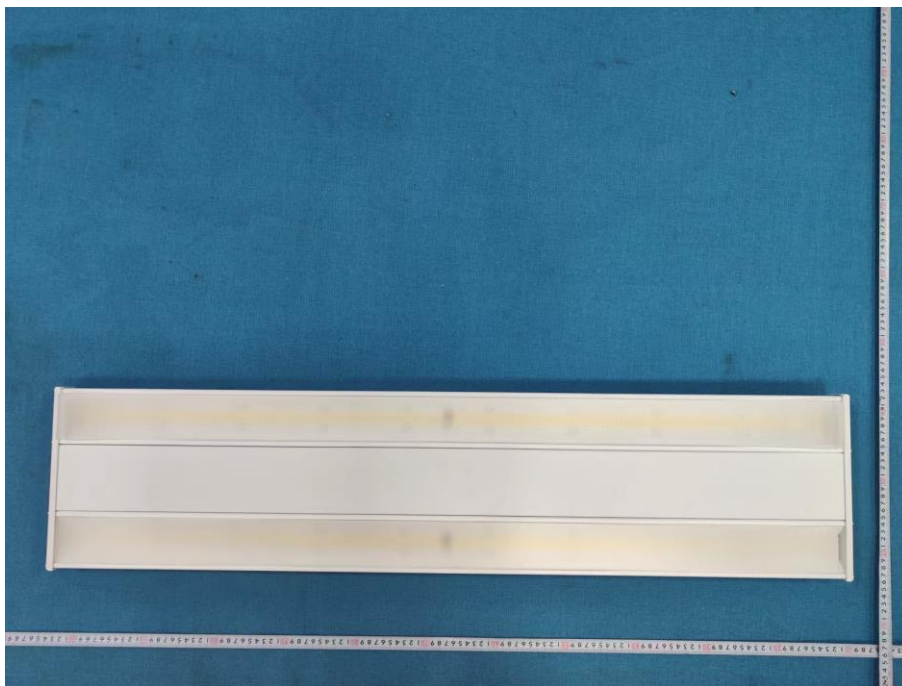


Figure 1

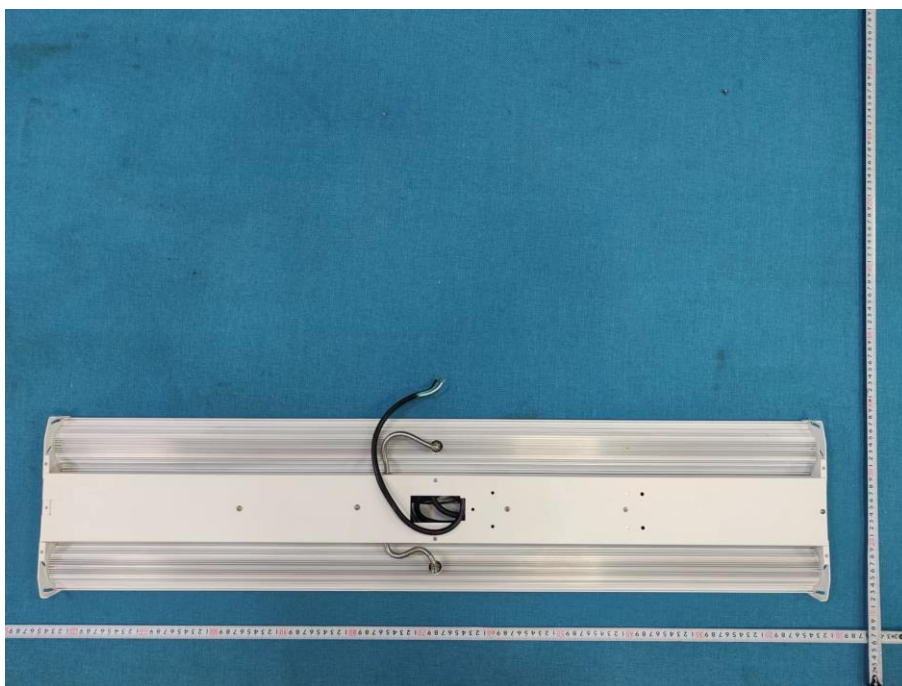


Figure 2

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