

LM-79-08 Test Report

For

IKIO LED LIGHTING, LLC (Brand Name: IKIO)

8470 Allison Pointe Blvd, Suite 128 Indianapolis, IN 46250

Low Bay Luminaires for Commercial and Industrial Buildings

Direct Linear Ambient Luminaires

Model name(s): IK-LLB08-70W-30/40/50K-MV (70W)

Representative (Tested) Model:

IK-LLB08-70W-30/40/50K-MV (70W,30K) (Setting at 3000K)
IK-LLB08-70W-30/40/50K-MV (70W,40K) (Setting at 4000K)
IK-LLB08-70W-30/40/50K-MV (70W,50K) (Setting at 5000K)

Model Different: All construction and rating are the same, except CCT

Test & Report By:

Sophie Yang

Engineer: Sophie Yang



Date: 2021-11-10

Review By:

Jason Luo

Manager: Jason Luo

1.1 Product Information:

Organization Name	IKIO LED LIGHTING, LLC	
Brand Name	IKIO	
Model Number	IK-LLB08-70W-30/40/50K-MV (70W)	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Low Bay Luminaires for Commercial and Industrial Buildings Direct Linear Ambient Luminaires	
Rated Voltage / Frequency	120-277 VAC, 50/60 Hz	
Nominal Power	70W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K, 4000K, 5000K (Color tunable)	
LED Manufacturer	Lumileds Holding B.V.	
LED Model	L128-XX80RA35002U1	
Sample Number	BLC2110022E-D1	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s
Photo		
		
		

1.2 Test Specifications:

Date of Receipt	2021-10-15
Date of Test	2021-10-19
Test item	<ol style="list-style-type: none"> 1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	<ol style="list-style-type: none"> 1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	BL-QP-033

1.3 Test Methods

1) Photometric and Light Distribution Measurement – Goniophotometer Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals.

2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.

3) Electrical Measurements:

Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.

2.1 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2021-10-19	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	IK-LLB08-70W-30/40/50K-MV (70W,30K) (Setting at 3000K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC211002	120.0	60	0.605	72.1	0.993	11.67
2E-D1	277.0	60	0.262	71.65	0.989	11.04
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

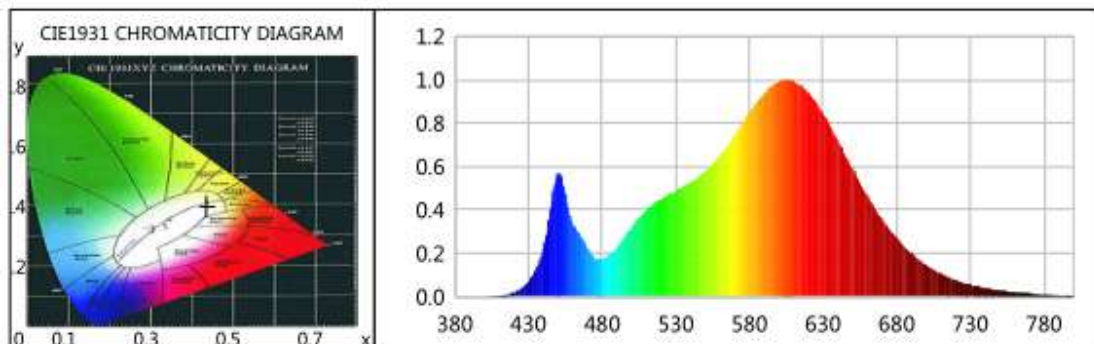
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	11
Frequency (Hz)	60	R2	92	R10	83
CCT (K)	2942	R3	96	R11	83
Duv	-0.0017	R4	82	R12	76
Chromaticity (x, y)	x=0.4385 y=0.4002	R5	84	R13	85
Chromaticity (u', v')	u(u')=0.2533 v'=0.5201	R6	92	R14	99
Color Rendering Index (CRI)	84	R7	81	R15	75
R9	11	R8	60	--	--
Rf	85	--	--	--	--
Rg	97	--	--	--	--
Rcs,h1 (%)	-11	--	--	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result		DLC V5.1 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	10103.6	10134.8	Option 1: 5000-10000lm (-10%) Option 2: >=375lm/ft (-10%)
Luminous Efficacy (lm/W)	140.13	141.45	Standard: >= 115(-3%)
Most worst Luminous/Highest Watts	140.13		

Spectral Power Distribution & Chromaticity Diagram



WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0002	0.0493	535	0.4706	101.1119	690	0.3583	76.9827
385	0.0003	0.0694	540	0.4866	104.5400	695	0.3117	66.9748
390	0.0007	0.1489	545	0.5053	108.5712	700	0.2704	58.1050
395	0.0003	0.0594	550	0.5284	113.5239	705	0.2325	49.9614
400	0.0011	0.2299	555	0.5479	117.7219	710	0.2001	42.9982
405	0.0023	0.4870	560	0.5782	124.2262	715	0.1719	36.9271
410	0.0044	0.9378	565	0.6107	131.1974	720	0.1471	31.5958
415	0.0099	2.1195	570	0.6498	139.6189	725	0.1250	26.8566
420	0.0204	4.3802	575	0.6946	149.2233	730	0.1076	23.1089
425	0.0393	8.4424	580	0.7420	159.4265	735	0.0901	19.3651
430	0.0717	15.4064	585	0.7942	170.6409	740	0.0778	16.7188
435	0.1263	27.1458	590	0.8460	181.7530	745	0.0659	14.1603
440	0.2221	47.7266	595	0.8927	191.8042	750	0.0563	12.0928
445	0.4041	86.8129	600	0.9362	201.1482	755	0.0473	10.1665
450	0.5675	121.9321	605	0.9683	208.0282	760	0.0404	8.6862
455	0.4739	101.8135	610	0.9919	213.1138	765	0.0351	7.5384
460	0.3350	71.9675	615	1.0000	214.8413	770	0.0304	6.5288
465	0.2856	61.3559	620	0.9953	213.8342	775	0.0255	5.4859
470	0.2236	48.0357	625	0.9738	209.2118	780	0.0218	4.6805
475	0.1784	38.3346	630	0.9427	202.5459	785	0.0188	4.0411
480	0.1753	37.6620	635	0.8986	193.0561	790	0.0165	3.5492
485	0.1942	41.7158	640	0.8438	181.2985	795	0.0133	2.8618
490	0.2258	48.5119	645	0.7840	168.4336	800	0.0099	2.1370
495	0.2713	58.2882	650	0.7197	154.6161			
500	0.3197	68.6868	655	0.6532	140.3413			
505	0.3626	77.9111	660	0.5893	126.6098			
510	0.4001	85.9684	665	0.5252	112.8291			
515	0.4289	92.1500	670	0.4650	99.8951			
520	0.4506	96.8117	675	0.4090	87.8723			
525	0.4706	101.1119	680	0.3583	76.9827			
530	0.4866	104.5400	685	0.3117	66.9748			

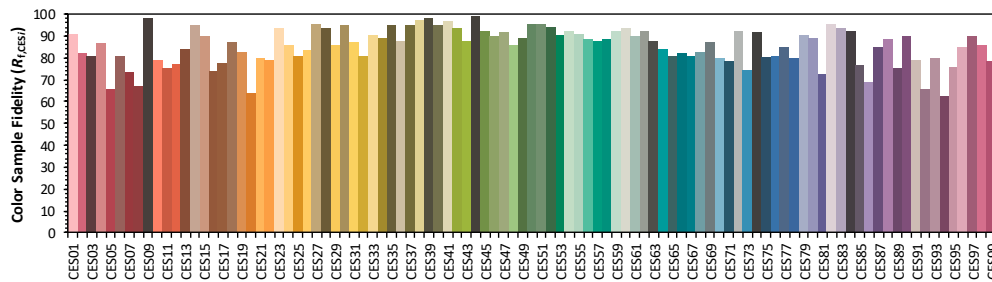
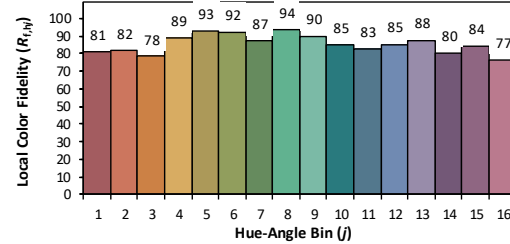
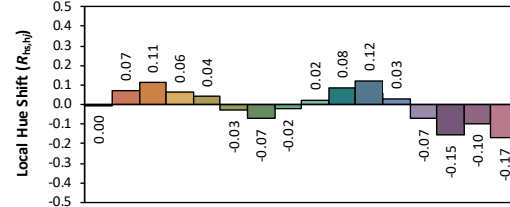
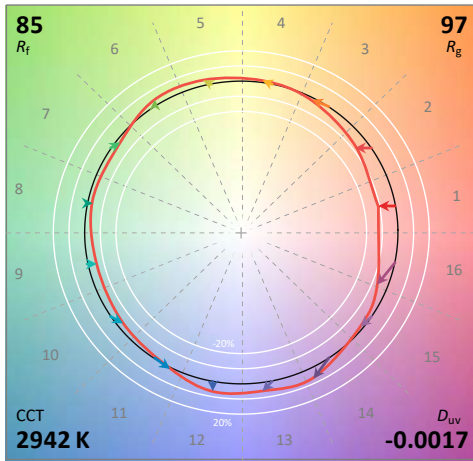
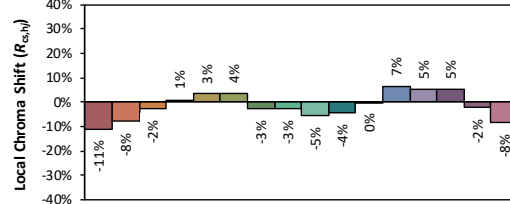
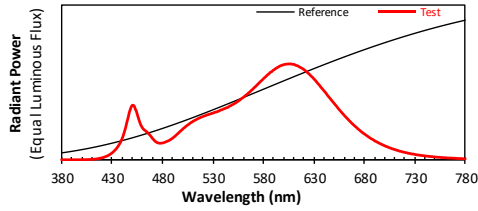
TM30

ANSI/IES TM-30-18 Color Rendition Report

Source: L128-XX80RA35002U1

Manufacturer: IKIO LED LIGHTING

Date: 2021/10/19

Model: IK-LLB08-70W-30/40/50K-MV (70W, 30K)
(Setting at 3000K)


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

x 0.4385
y 0.4002
u' 0.2533
v' 0.5201

CIE 13.3-1995
(CRI)
Ra 84
R9 11

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

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2021-10-19	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	IK-LLB08-70W-30/40/50K-MV(70W,40K) (Setting at 4000K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC211002	120.0	60	0.582	69.41	0.994	11.69
2E-D1	277.0	60	0.252	69.04	0.99	10.98
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

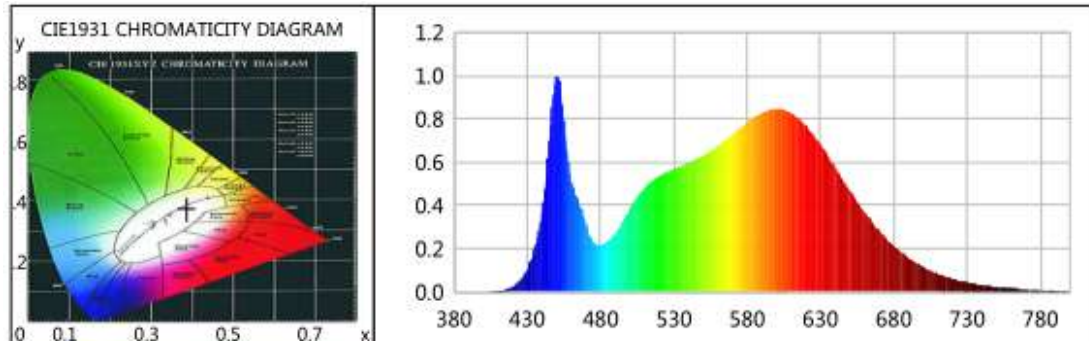
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	85	R9	21
Frequency (Hz)	60	R2	92	R10	80
CCT (K)	3792	R3	95	R11	85
Duv	-0.0030	R4	85	R12	68
Chromaticity (x, y)	x=0.3876 y=0.3745	R5	85	R13	87
Chromaticity (u', v')	u(u')=0.2307 v'=0.5017	R6	88	R14	98
Color Rendering Index (CRI)	86	R7	86	R15	80
R9	21	R8	68	--	--
Rf	85				
Rg	98				
Rcs,h1 (%)	-10	--	--	--	--

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V5.1 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	10913.2	10957.4	Option 1: 5000-10000lm (-10%) Option 2: >=375lm/ft (-10%)
Luminous Efficacy (lm/W)	157.23	158.71	Standard: >= 115(-3%)
Most worst Luminous/Highest Watts	157.23		

Spectral Power Distribution & Chromaticity Diagram



WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0004	0.0873	535	0.5548	135.0937	690	0.2836	69.0572
385	0.0005	0.1257	540	0.5684	138.3917	695	0.2467	60.0752
390	0.0002	0.0606	545	0.5817	141.6345	700	0.2129	51.8289
395	0.0007	0.1589	550	0.5976	145.5216	705	0.1842	44.8499
400	0.0012	0.2903	555	0.6111	148.7905	710	0.1577	38.4024
405	0.0021	0.5028	560	0.6303	153.4793	715	0.1356	33.0246
410	0.0049	1.2026	565	0.6515	158.6296	720	0.1157	28.1683
415	0.0112	2.7205	570	0.6762	164.6591	725	0.0988	24.0666
420	0.0256	6.2285	575	0.7017	170.8526	730	0.0850	20.6860
425	0.0532	12.9505	580	0.7278	177.2065	735	0.0728	17.7344
430	0.1055	25.6993	585	0.7583	184.6402	740	0.0613	14.9255
435	0.2004	48.7862	590	0.7860	191.3767	745	0.0531	12.9324
440	0.3683	89.6877	595	0.8080	196.7398	750	0.0450	10.9679
445	0.6994	170.3058	600	0.8283	201.6901	755	0.0372	9.0697
450	1.0000	243.4923	605	0.8405	204.6545	760	0.0327	7.9623
455	0.7950	193.5783	610	0.8473	206.3068	765	0.0285	6.9290
460	0.5146	125.2956	615	0.8425	205.1371	770	0.0233	5.6753
465	0.4204	102.3673	620	0.8278	201.5587	775	0.0199	4.8461
470	0.3115	75.8389	625	0.8030	195.5300	780	0.0175	4.2697
475	0.2302	56.0611	630	0.7708	187.6726	785	0.0145	3.5317
480	0.2183	53.1472	635	0.7280	177.2742	790	0.0118	2.8738
485	0.2358	57.4234	640	0.6809	165.7845	795	0.0101	2.4705
490	0.2682	65.3021	645	0.6302	153.4601	800	0.0088	2.1454
495	0.3238	78.8347	650	0.5765	140.3680			
500	0.3830	93.2590	655	0.5207	126.7869			
505	0.4352	105.9589	660	0.4675	113.8310			
510	0.4805	117.0000	665	0.4180	101.7731			
515	0.5127	124.8369	670	0.3679	89.5920			
520	0.5367	130.6908	675	0.3228	78.5942			
525	0.5548	135.0937	680	0.2836	69.0572			
530	0.5684	138.3917	685	0.2467	60.0752			

TM30

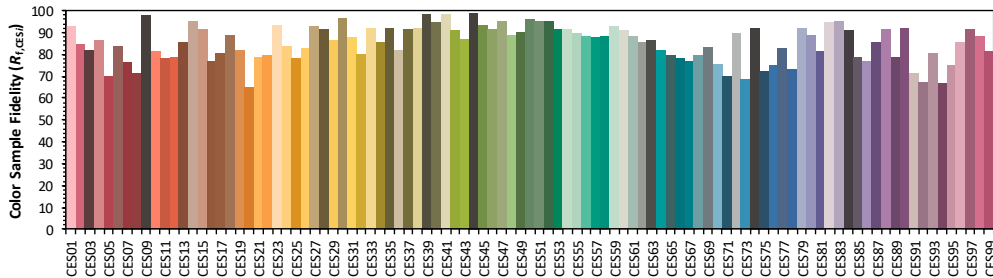
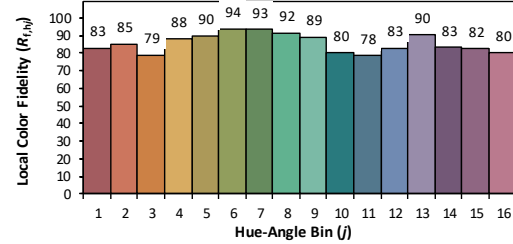
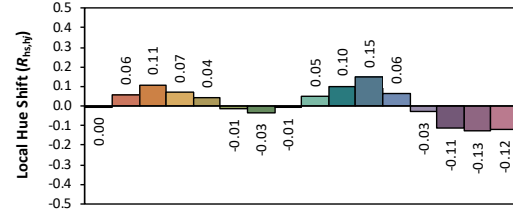
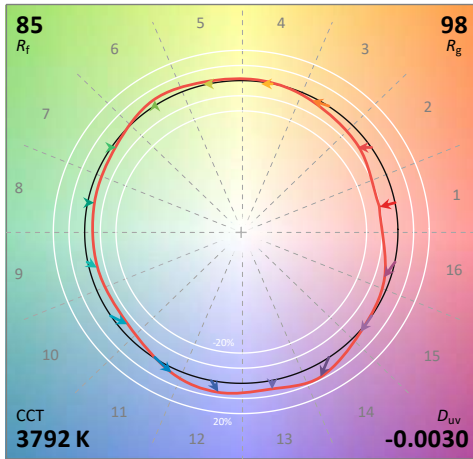
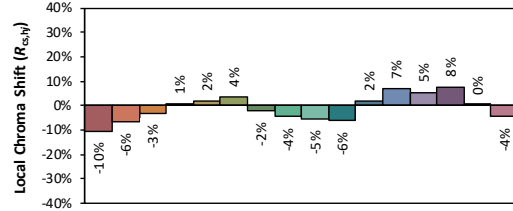
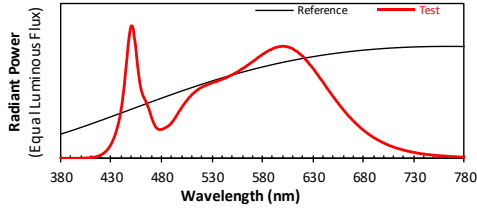
ANSI/IES TM-30-18 Color Rendition Report

Source: L128-XX80RA35002U1

Manufacturer: IKIO LED LIGHTING

Date: 2021/10/19

Model: IK-LLB08-70W-30/40/50K-MV (70W, 40K)
(Setting at 4000K)



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

x 0.3876
 y 0.3745
 u' 0.2307
 v' 0.5017

CIE 13.3-1995
(CRI)
 R_a 86
 R_9 21

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

2.3 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2021-10-19	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	IK-LLB08-70W-30/40/50K-MV(70W,50K) (Setting at 5000K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC211002	120.0	60	0.604	71.96	0.993	11.82
2E-D1	277.0	60	0.261	71.5	0.988	11.08
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

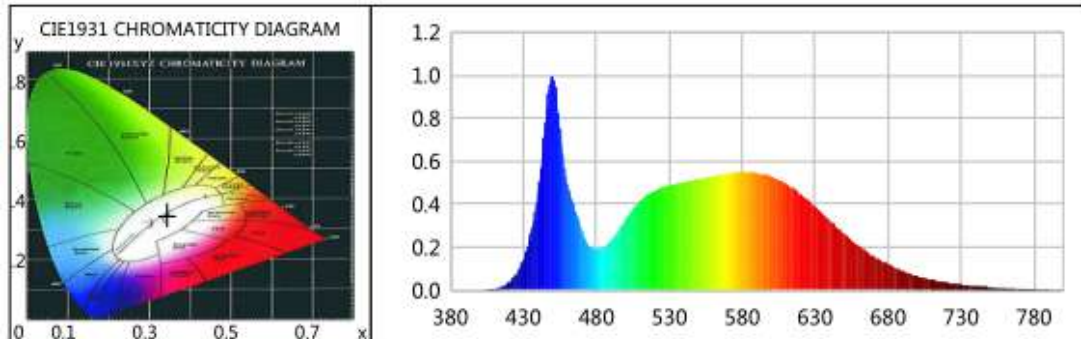
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	12
Frequency (Hz)	60	R2	87	R10	69
CCT (K)	5079	R3	90	R11	84
Duv	0.0010	R4	84	R12	62
Chromaticity (x, y)	x=0.3431 y=0.3518	R5	83	R13	83
Chromaticity (u', v')	u(u')=0.2100 v'=0.4845	R6	82	R14	95
Color Rendering Index (CRI)	83	R7	87	R15	77
R9	12	R8	69	--	--
Rf	83				
Rg	98				
Rcs,h1 (%)	-12	--	--	--	--

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V5.1 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	10536.8	10588.0	Option 1: 5000-10000lm (-10%) Option 2: >=375lm/ft (-10%)
Luminous Efficacy (lm/W)	146.43	148.08	Standard: >= 115(-3%)
Most worst Luminous/Highest Watts	146.43		

Spectral Power Distribution & Chromaticity Diagram



WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0006	0.1907	535	0.4788	153.8534	690	0.1599	51.3651
385	0.0006	0.1798	540	0.4870	156.4735	695	0.1390	44.6555
390	0.0004	0.1362	545	0.4943	158.8085	700	0.1211	38.9076
395	0.0009	0.2768	550	0.5036	161.8176	705	0.1044	33.5383
400	0.0012	0.3849	555	0.5076	163.0937	710	0.0902	28.9876
405	0.0034	1.0771	560	0.5159	165.7469	715	0.0776	24.9244
410	0.0072	2.3018	565	0.5232	168.1044	720	0.0660	21.1980
415	0.0168	5.3824	570	0.5315	170.7664	725	0.0569	18.2724
420	0.0364	11.6810	575	0.5372	172.6108	730	0.0487	15.6411
425	0.0749	24.0570	580	0.5433	174.5572	735	0.0414	13.2981
430	0.1452	46.6542	585	0.5465	175.5924	740	0.0367	11.7787
435	0.2621	84.2138	590	0.5486	176.2602	745	0.0305	9.8003
440	0.4564	146.6295	595	0.5487	176.2927	750	0.0259	8.3071
445	0.7845	252.0689	600	0.5454	175.2292	755	0.0223	7.1514
450	1.0000	321.2993	605	0.5373	172.6384	760	0.0189	6.0792
455	0.7573	243.3312	610	0.5302	170.3379	765	0.0158	5.0812
460	0.4947	158.9455	615	0.5147	165.3798	770	0.0141	4.5413
465	0.3857	123.9353	620	0.4961	159.3894	775	0.0121	3.8730
470	0.2768	88.9366	625	0.4745	152.4509	780	0.0101	3.2558
475	0.2046	65.7348	630	0.4486	144.1288	785	0.0093	3.0021
480	0.1900	61.0561	635	0.4189	134.5966	790	0.0073	2.3333
485	0.2012	64.6598	640	0.3891	125.0212	795	0.0063	2.0184
490	0.2300	73.8850	645	0.3582	115.0848	800	0.0057	1.8466
495	0.2782	89.3783	650	0.3249	104.4042			
500	0.3301	106.0748	655	0.2930	94.1274			
505	0.3758	120.7442	660	0.2630	84.5002			
510	0.4164	133.7766	665	0.2339	75.1647			
515	0.4441	142.6805	670	0.2065	66.3607			
520	0.4634	148.8758	675	0.1819	58.4301			
525	0.4788	153.8534	680	0.1599	51.3651			
530	0.4870	156.4735	685	0.1390	44.6555			

TM30

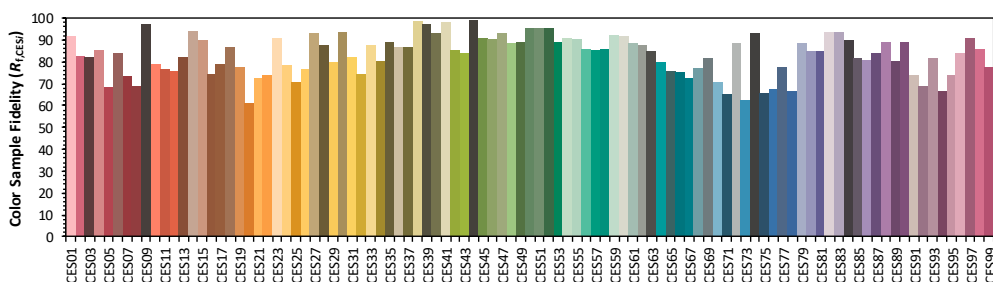
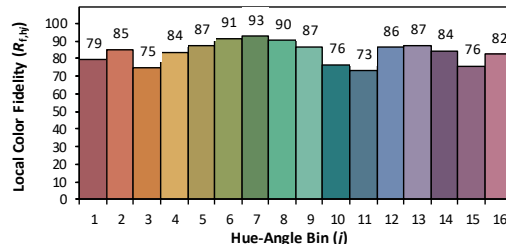
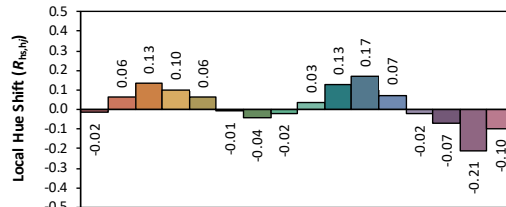
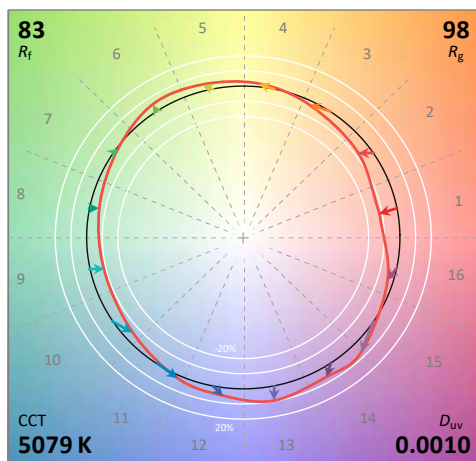
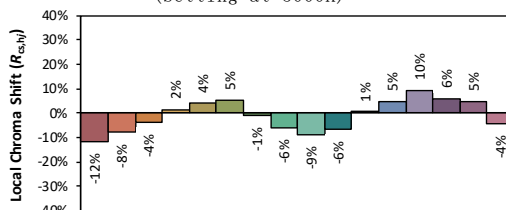
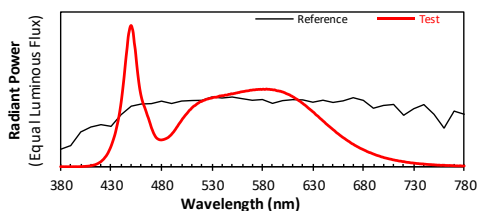
ANSI/IES TM-30-18 Color Rendition Report

Source: L128-XX80RA35002U1

Manufacturer: IKIO LED LIGHTING

Date: 2021/10/19

Model: IK-LLB08-70W-30/40/50K-MV (70W, 50K)
(Setting at 5000K)



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

x 0.3431
 y 0.3518
 u' 0.2100
 v' 0.4845

CIE 13.3-1995
(CRI)
 R_a 83
 R_9 12

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

Zonal Lumen Tabulation

Remark: The goniophotometer results of
AST-LA01C-70W8FTBTB1DA5-abd were represented by
AST-LA01C-40W4FTBTB1DA5-abcd, by same section construction and size,
just different in length.

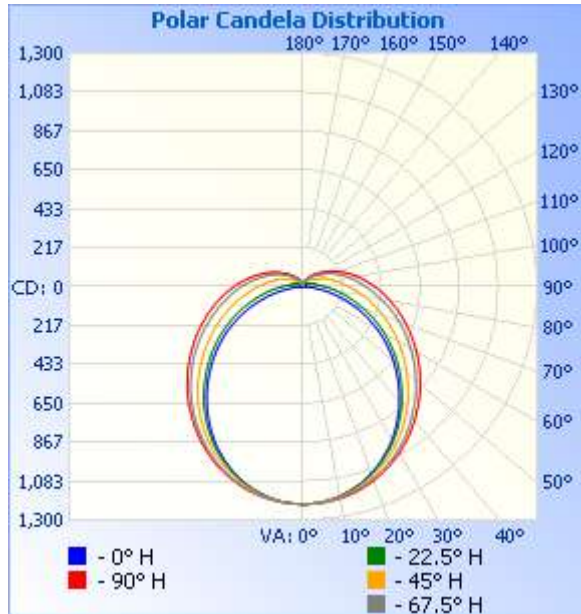
Zonal Lumen Summary

Zone	Lumens	% Lamp	% Luminaire
0-30	940.6	20.2%	20.2%
0-40	1,544.3	33.2%	33.2%
0-60	2,791.6	60%	60%
60-90	1,242.1	26.7%	26.7%
70-100	931.0	20%	20%
90-120	470.7	10.1%	10.1%
0-90	4,033.7	86.7%	86.7%
90-180	618.6	13.3%	13.3%
0-180	4,652.3	100%	100%

Lumens Per Zone

Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	114.6	2.5%	90-100	215.7	4.6%
10-20	328.2	7.1%	100-110	152.6	3.3%
20-30	497.9	10.7%	110-120	102.4	2.2%
30-40	603.7	13.0%	120-130	64.2	1.4%
40-50	638.7	13.7%	130-140	40.0	0.9%
50-60	608.6	13.1%	140-150	24.0	0.5%
60-70	526.8	11.3%	150-160	12.9	0.3%
70-80	414.4	8.9%	160-170	5.5	0.1%
80-90	300.9	6.5%	170-180	1.3	0%

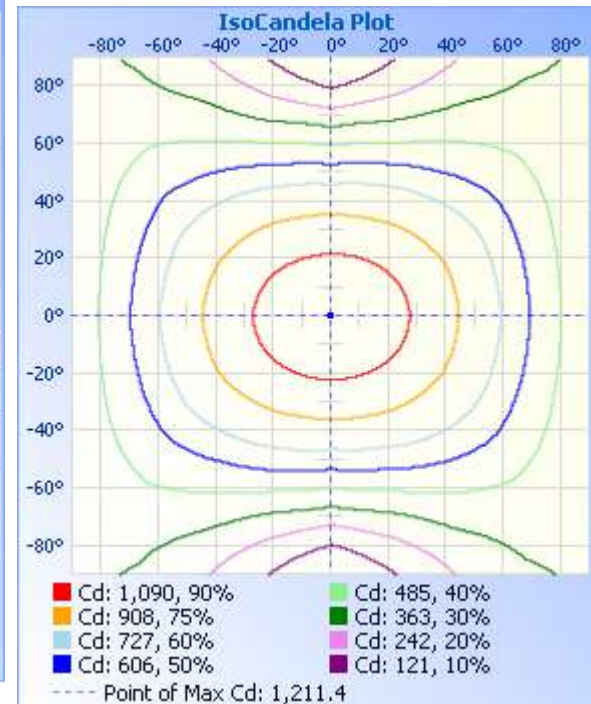
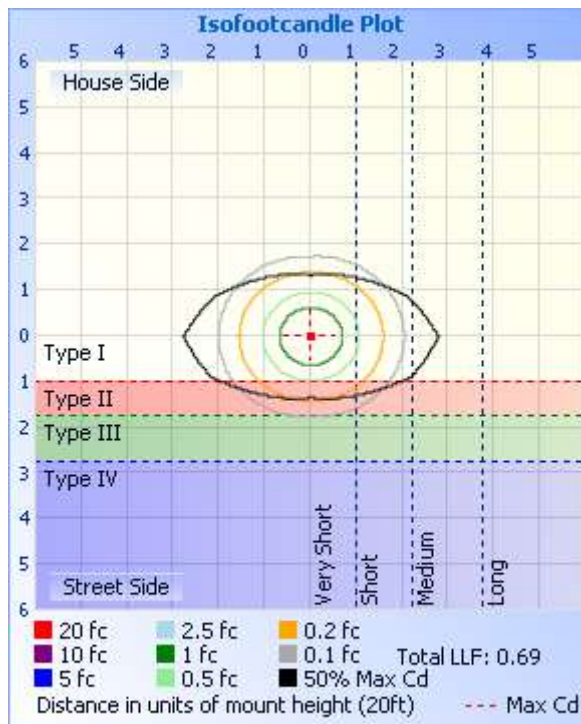
Photometric Data



Illuminance at a Distance

Center Beam fc	Beam Width	
4.19 fc	45.3 ft	92.2 ft
1.05 fc	90.5 ft	184.3 ft
0.47 fc	135.8 ft	276.5 ft
0.26 fc	181.1 ft	368.6 ft
0.17 fc	226.3 ft	460.8 ft
0.12 fc	271.6 ft	552.9 ft

■ Vert. Spread: 106.2°
 ■ Horiz. Spread: 139.5°



3. Test Equipment

Equipment Name	Model No.	Serial No.	Next Calibration Date
Goniophotometric System	GPM-3000	DYHXF120001	2022-01-18
AC Power Source	CHP-500	DYBWD010159	2022-01-25
Total Luminous Flux Standard Lamp	24V/150W	DYJYR040040	2022-01-24
Digital Power Meter	WT500	DYDWQ20010	2022-01-25
Integral Sphere (2M)	2M	DYJCE120067	2022-01-18
Digital Power Meter	WT500	DYDWQ20006	2022-01-25
Optical Color and Electrical Measurement System	CMS-3000S	DYJCE120067	2022-01-18
Expand Uncertainty: Photometric Measurement (Sphere): 2.08%, k=2 Chromaticity Measurement(Sphere):25.6K, k=2 Photometric Measurement(Goniophotometer):2.645%, k=2			

***** END OF REPORT *****