



SHENZHEN XIN AN BIAO TECHNOLOGY SERVICE CO. LTD

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# Energy Star Test Report

For

## IKIO LED LIGHTING

(Brand Name: IKIO)

8470 Allison Pointe Blvd, Suite 128 Indianapolis, IN 46250

**Model name(s):**  
**IK-DLR8L-172430-CCT**

**Report Type:** Testing and Report According to ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2

**Type of Luminaire:** Downlights

**Test Date:** 2022-02-26

**Report Date:** 2022-03-11

*Kyle Xiao*

Engineer: Kyle Xiao

*Garman Mo*

Manager: Garman Mo

Note: 1.The results contained in this report pertain only to the tested samples.  
2.This report does not imply product certification, approval, or endorsement by A2LA or any agency of the Federal Government.  
3.This report contains data that are not covered by the A2LA accreditation.

<b>1.1 Product Information:</b>		
Model Number	IK-DLR8L-172430-CCT	
Remark	<p>The CCT and power are adjustable.</p> <p>The default CCT setting is 2700K.</p> <p>The most consumptive CCT setting is 2700K.</p> <p>The most ineffective CCT setting is 2700K</p> <p>All tests and evaluations are performed at the lowest effective white light setting.</p>	
Representative (Tested) Model	IK-DLR8L-172430-CCT	
Model Difference	N/A	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Downlights	
Directional/Non-directional	Directional	
Mounting Type	Recessed	
IC/Non-IC	IC	
LED Manufacturer	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch	
LED Model	HL-AS-2835HW-2C-S1-08-PCT-HR3	
Dimming	Dimmable	
Sample Number	JBE220104-B1	
Date of Receipt	2022-02-23	
Use of Senarios	Indoor	
Luminaire Aperture	8	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

<b>1.2 Rated Values:</b>	
Rated Voltage / Frequency	120-277Vac, 60Hz
Nominal Power	17W/24W/30W
Rated Initial Lamp Lumen	--
Declared CCT	2700K,3000K,3500K,4000K,5000K (Color Tunable)

### 1.3 Product Photos

#### IK-DLR8L-172430-CCT



#### 1.4 Test Specifications:

Test item	<ol style="list-style-type: none"> <li>1. Total Luminous Flux</li> <li>2. Luminous Distribution Intensity</li> <li>3. Luminous Efficacy</li> <li>4. Correlated Color Temperature</li> <li>5. Color Rendering Index</li> <li>6. Chromaticity Coordinate</li> <li>7. Electrical Parameters</li> <li>8. Color Angular Uniformity</li> <li>9. Dimming</li> <li>10. Flicker</li> <li>11. Operating Frequency</li> <li>12. Starting Time</li> <li>13. Transient Protection Test</li> <li>14. In-Situ Temperature Measurement Test</li> <li>15. Standby Power Consumption</li> </ol>
Reference Standard	<ol style="list-style-type: none"> <li>1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products</li> <li>2. ANSI C78.377-2015 Specifications for the Chromaticity of Solid State Lighting Products</li> <li>3. C82.77-10:2014 American National Standard for Lighting Equipment-Harmonic Emission Limits-Related Power Quality Requirements</li> <li>4. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources</li> <li>5. CIE 15-2004 Technical Report Colorimetry</li> <li>6. ANSI/UL 1598:2008,Luminaire</li> <li>7. ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) – Version 2.2</li> <li>8. ANSI/IEEE C62.41.2:2002 IEEE Recommended Practice on Characterization of Surges in Low-Voltage(1000V and Less) AC Power Circuits</li> <li>9. IEC 62301:2011Household electrical appliances - Measurement of standby power</li> <li>10. NEMA 77-2017 Standard for Temporal Light Artifacts: Test Methods and Guidance for Acceptance Criteria</li> </ol>
Remark	<p>Below test and data are not covered by A2LA accreditation:</p> <ul style="list-style-type: none"> <li>- Operating Frequency</li> <li>- Noise</li> </ul>

## 1.5 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  $1^{\circ}$  vertical intervals and  $22.5^{\circ}$  horizontal intervals.

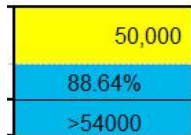
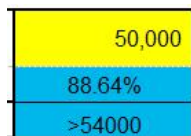
### 2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

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 Summary of Test Result

Criteria Item	The Type of Luminaires	Requirement (ES for Luminaires V2.2)	Measured Value	Status
Input Wattage	All	$\leq$ Rated Wattage	27.88W	Pass
Luminous Efficacy	Downlights	$\geq 55$ lm/W	87.55lm/W	Pass
Luminaire Minimum Light Output	Downlights	$\leq 4.5''$ aperture: 345 lumens $> 4.5''$ aperture: 575 lumens	2440.9lm	Pass
Luminaire Zonal Lumen Density Requirement	Downlights	$\geq 75\%$ of total initial lumens within the 0-60° zone	90.1%	Pass
Correlated Color Temperature (CCT)	Solid State	Shall be capable of providing at least one of the following nominal correlated color temperatures (CCTs): • 2700 Kelvin • 3000 Kelvin • 3500 Kelvin • 4000 Kelvin • 5000 Kelvin	2687K Duv=0.0019	Pass
Color Rendering Index (CRI)	Solid State	$R_a \geq 80$ $R_9 > 0$	$R_a = 91.7$ $R_9 = 57$	Pass
Color Angular Uniform	Directional Solid State Indoor Luminaires	The variation of chromaticity shall be within 0.006 from the weighted average point on the CIE 1976(u',v') diagram	0.0009	Pass
Lumen Maintenance	Solid State Option 1:	L70 lumen maintenance: $\geq 25,000$ hours for indoor $\geq 35,000$ hours for outdoor $\geq 50,000$ hours for inseparable luminaires		Pass
Light Source Life	Solid State	L70 lumen maintenance: $\geq 25,000$ hours for indoor $\geq 35,000$ hours for outdoor $\geq 50,000$ hours for		Pass

		inseparable luminaires		
Color Maintenance	Solid State Indoor Luminaires	$\Delta u'v' \leq 0.007$	Max.0.0041 in LM-80 report*	Pass
Source Start Time	Solid State	<750 ms	42ms	Pass
Power Factor	Solid State	Total luminaire input power $\leq 5$ watts: PF $\geq 0.5$ Total luminaire input power > 5 watts: PF $\geq 0.7$	0.969	Pass
Transient Protection	Solid State	The line transient shall consist of seven strikes of a 100 kHz ring wave, 2.5 kV level, for both common mode and differential mode.	Survival	Pass
Standby Power Consumption	All Luminaires	Luminaires shall not draw power in the off state.	0W	Pass
Operating Frequency	Solid State	Frequency $\geq 120$ Hz	120.000Hz	Pass
Maximum Measured Driver Case Temperature	Solid State	shall not exceed the driver manufacturer's maximum recommended temperature during in situ operation. $\leq 105$ °C	54.7°C	Pass
Maximum In-Situ Source Temperature	Solid State	Maximum permitted Ts temperature for L70 $\geq$ 50,000 hrs $\leq 105$ °C	75.2°C	Pass
Dimming	Solid State	The luminaire and its components shall provide continuous dimming from 100% to 20% of total light output. Luminaire shall not emit noise above 24dBA at 1 meter or less at the minimum output.	Validated	Pass



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Warranty Requirements	Solid State	incorporating replaceable drivers: $\geq 3$ years incorporating non-replaceable drivers: $\geq 5$ years	5 years	Pass
CCT	Solid State	Packaging shall clearly describe the nominal color designation in units of Kelvin (e.g. 2700K, 3000K).	2700K,3000K, 3500K,4000K, 5000K	Pass

Note: The information or data with an “\*” are provided by the manufacturer.

Our laboratory has no responsibility for the decision of compliance with specification that based on the data or information with the “\*”.



<b>2.2.1 Electrical, Photometric and Chromaticity Measurements</b>	<b>IES LM-79 2008</b>
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<b>Test date</b>	2022-02-26	<b>Test Ambient:</b>	25.1° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	IK-DLR8L-172430-CCT (mode:2700K)	<b>Total Operating Time (min)</b>	90

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz )	Current (A)	Power (W)	Power Factor
JBE220104-B1	120.0	60	0.240	27.88	0.969

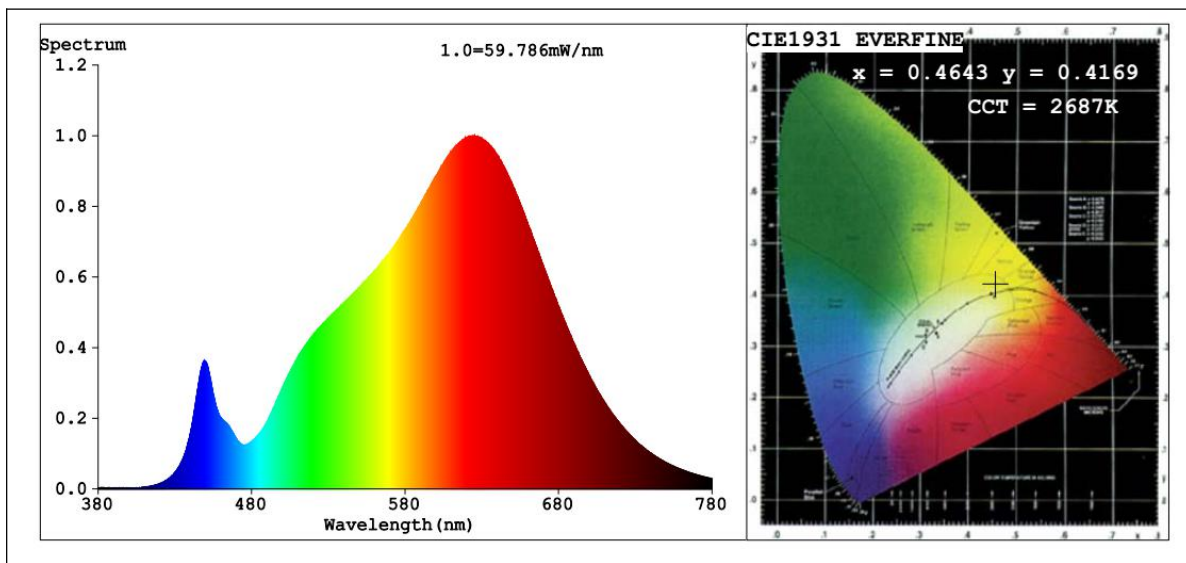
**Sphere-Spectroradiometer Method(Self-absorption:1.1235):**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Color Rendering Index (CRI)	91.7
R9	57
CCT (K)	2687
Duv	0.0019

**Goniophotometer Method(Test Distance:11.50m):**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	2440.9
Luminous Efficacy (lm/W)	87.55
Beam Angle°	96.5
Center Beam Candle Power (cd)	1119

## Spectral Power Distribution and Chromaticity Diagram



## Colorimetric Parameters

### Color Parameters:

Chromaticity Coordinate: $x=0.4643$   $y=0.4169$ / $u'=0.2625$   $v'=0.5304$

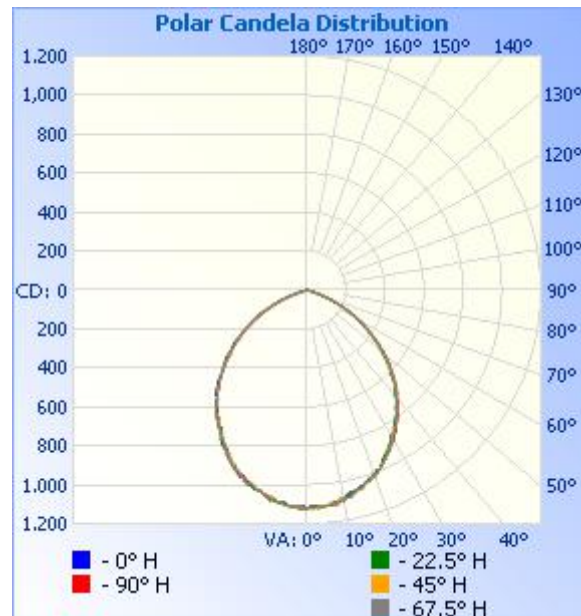
CCT=2687K(Duv=0.0019) Dominant WL:Ld =583.7nm WL:Lc = --nm Purity=64.5%

Ratio:R=26.3% G=71.6% B=2.0% Peak WL:Lp=625.3nm FWHM=147.7nm

Render Index:Ra=91.7 AvgR=88.4 TM30:Rf=92 Rg=99

R1 =92	R2 =94	R3 =96	R4 =93	R5 =91	R6 =94	R7 =93
R8 =81	R9 =57	R10=86	R11=94	R12=80	R13=92	R14=97 R15=87

## Zonal Lumen Tabulation



Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	837.9	34.3%
0-40	1,338.9	54.9%
0-60	2,199.4	90.1%
60-90	241.0	9.9%
70-100	34.8	1.4%
90-120	0	0%
0-90	2,440.5	100%
90-180	0	0%
0-180	2,440.5	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	%Total
0-10	105.1	4.3%	90-100	0	0%
10-20	296.3	12.1%	100-110	0	0%
20-30	436.4	17.9%	110-120	0	0%
30-40	501.0	20.5%	120-130	0	0%
40-50	482.9	19.8%	130-140	0	0%
50-60	377.6	15.5%	140-150	0	0%
60-70	206.2	8.5%	150-160	0	0%
70-80	34.8	1.4%	160-170	0	0%
80-90	0	0.0%	170-180	0	0%



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	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119
1	1111	1111	1124	1111	1111	1111	1111	1111	1111	1124	1124	1124	1111	1124	1111	1111	1111
2	1111	1111	1124	1111	1111	1111	1111	1111	1111	1111	1111	1124	1124	1111	1124	1111	1111
3	1111	1111	1111	1124	1111	1111	1111	1111	1111	1111	1111	1111	1111	1124	1124	1111	1111
4	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111
5	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1098	1111	1111
6	1111	1111	1098	1111	1111	1098	1111	1098	1098	1098	1111	1111	1111	1098	1098	1098	1111
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23	979	979	979	979	979	979	979	979	979	965	965	979	965	979	979	979	979
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27	926	926	913	926	913	913	926	926	913	926	926	913	913	926	913	926	926
28	913	899	913	899	899	913	913	913	913	913	899	899	899	913	899	913	913



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29	899	886	899	899	899	899	899	899	899	899	886	886	886	899	886	886	899
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32	846	846	833	846	860	846	860	846	846	833	846	846	833	846	846	846	846
33	820	833	833	833	833	833	846	833	833	833	833	833	833	833	833	833	820
34	820	807	820	820	820	833	820	820	820	820	807	820	807	820	820	820	820
35	794	794	807	807	807	820	807	807	794	807	794	807	794	794	807	794	794
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58	344	357	357	344	344	384	384	370	370	370	370	357	357	357	357	344	344
59	317	331	331	331	331	370	357	357	344	344	344	344	331	331	331	331	317
60	291	291	304	317	304	344	344	344	331	317	317	331	317	304	304	304	291

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61	278	278	278	278	291	304	317	317	304	304	304	291	291	291	291	291	278
62	251	251	251	251	264	291	291	291	278	291	278	278	278	264	251	264	251
63	238	238	238	238	251	278	278	264	278	264	264	264	251	251	238	238	238
64	212	212	212	212	225	238	238	251	251	238	238	238	225	225	225	225	212
65	198	185	185	198	198	238	238	238	225	212	225	212	198	198	198	198	198
66	172	172	172	172	185	212	198	198	198	198	185	198	185	172	172	185	172
67	145	145	159	159	145	185	185	185	172	185	185	172	159	159	159	159	145
68	132	132	145	145	132	159	159	159	159	159	159	145	145	132	145	145	132
69	106	106	119	106	119	145	145	145	145	145	132	132	119	106	119	106	106
70	79	93	93	79	93	132	132	119	119	106	119	119	93	106	93	106	79
71	79	79	79	66	79	106	106	106	93	93	93	93	79	79	79	79	79
72	66	66	53	66	53	93	79	79	79	79	66	66	66	66	66	66	66
73	40	53	53	40	40	66	66	66	53	66	53	53	53	53	53	40	40
74	40	26	40	40	26	40	53	40	53	40	40	40	40	26	40	40	40
75	26	26	26	13	13	40	26	26	40	26	26	26	13	13	13	13	26
76	0	13	0	0	0	26	13	13	13	13	0	13	0	13	13	0	0
77	0	0	0	0	0	13	13	0	0	0	0	0	0	0	0	0	0
78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project No.:JBE220104 Report No.:JBE220104-B

Report Format Number STP-QP019-103-A/1

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93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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105	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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109	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
113	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
114	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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119	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
122	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
123	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
124	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project No.:JBE220104 Report No.:JBE220104-B

Report Format Number STP-QP019-103-A/1

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125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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127	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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131	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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138	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
147	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
151	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
153	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Project No.:JBE220104 Report No.:JBE220104-B

Report Format Number STP-QP019-103-A/1

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157	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
158	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
161	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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164	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
178	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
179	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

<b>2.2.2 Electrical, Photometric and Chromaticity Measurements</b>	<b>IES LM-79 2008</b>
--	-----------------------

Test date	2022-02-26	Test Ambient:	25.1° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	IK-DLR8L-172430-CCT (mode:3000K)	Total Operating Time (min)	90

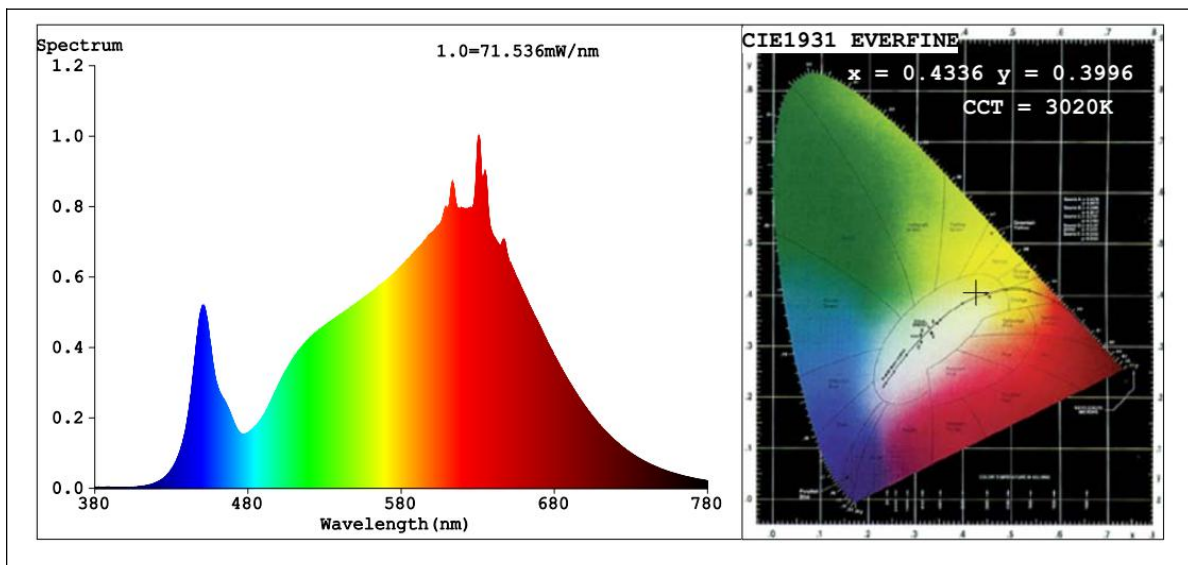
**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz )	Current (A)	Power (W)	Power Factor
JBE220104-B1	120.0	60	0.233	27.05	0.966

**Sphere-Spectroradiometer Method(Self-absorption:1.1236):**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Color Rendering Index (CRI)	93.6
R9	66
CCT (K)	3020
Duv	-0.0013
Total Luminous (lm)	2587
Luminous Efficacy (lm/W)	95.64

## Spectral Power Distribution and Chromaticity Diagram



## Colorimetric Parameters

### Color Parameters:

Chromaticity Coordinate:  $x=0.4336$   $y=0.3996$   $u'=0.2504$   $v'=0.5191$   
 CCT=3020K (Duv=-0.0013) Dominant WL:Ld =583.2nm WL:Lc = --nm Purity=50.1%  
 Ratio:R=24.4% G=72.8% B=2.7% Peak WL:Lp=630.6nm FWHM=124.0nm  
 Render Index:Ra=93.6 AvgR=90.8 TM30:Rf=92 Rg=101

R1 =95	R2 =96	R3 =96	R4 =94	R5 =94	R6 =95	R7 =93	
R8 =85	R9 =66	R10=90	R11=95	R12=80	R13=95	R14=97	R15=91

<b>2.2.3 Electrical, Photometric and Chromaticity Measurements</b>	<b>IES LM-79 2008</b>
--	-----------------------

<b>Test date</b>	2022-02-26	<b>Test Ambient:</b>	25.1° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	IK-DLR8L-172430-CCT (mode:3500K)	<b>Total Operating Time (min)</b>	90

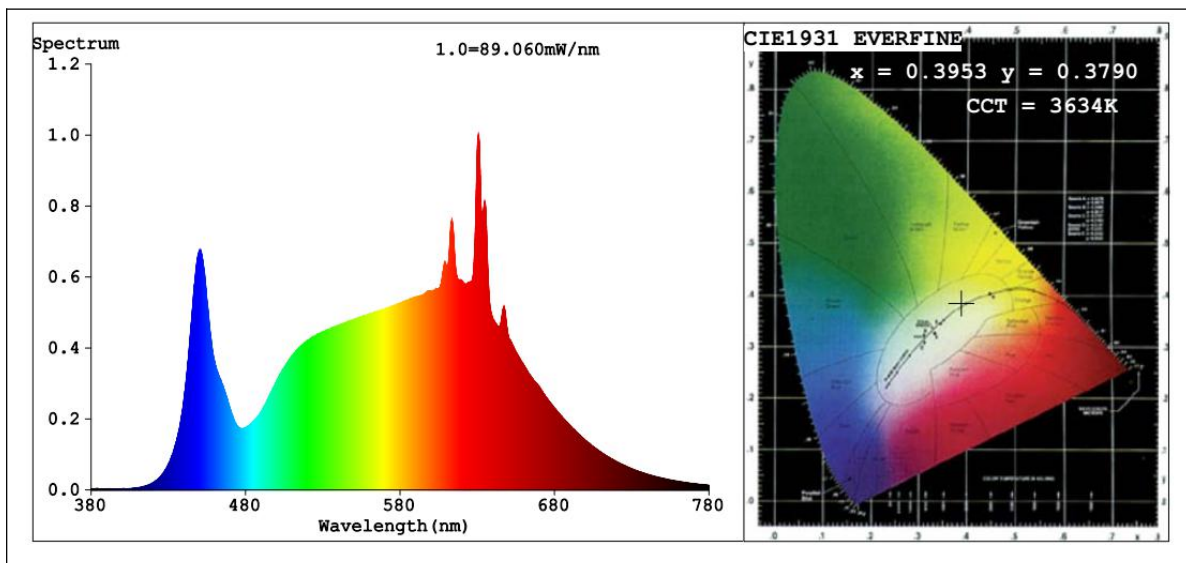
**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz )	Current (A)	Power (W)	Power Factor
JBE220104-B1	120.0	60	0.235	27.18	0.963

**Sphere-Spectroradiometer Method(Self-absorption:1.1236):**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Color Rendering Index (CRI)	94.5
R9	74
CCT (K)	3634
Duv	-0.0029
Total Luminous (lm)	2808
Luminous Efficacy (lm/W)	103.31

## Spectral Power Distribution and Chromaticity Diagram



## Colorimetric Parameters

### Color Parameters:

Chromaticity Coordinate:  $x=0.3953$   $y=0.3790$   $u'=0.2340$   $v'=0.5048$   
 CCT=3634K(Duv=-0.0029) Dominant WL:Ld =581.9nm WL:Lc = --nm Purity=32.4%  
 Ratio:R=21.7% G=74.7% B=3.5% Peak WL:Lp=630.8nm FWHM=77.4nm  
 Render Index:Ra=94.5 AvgR=91.9 TM30:Rf=92 Rg=102

R1 =97	R2 =96	R3 =94	R4 =95	R5 =96	R6 =94	R7 =95	
R8 =90	R9 =74	R10=90	R11=95	R12=76	R13=97	R14=96	R15=95

<b>2.2.4 Electrical, Photometric and Chromaticity Measurements</b>	<b>IES LM-79 2008</b>
--	-----------------------

Test date	2022-02-26	Test Ambient:	25.1° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	IK-DLR8L-172430-CCT (mode:4000K)	Total Operating Time (min)	90

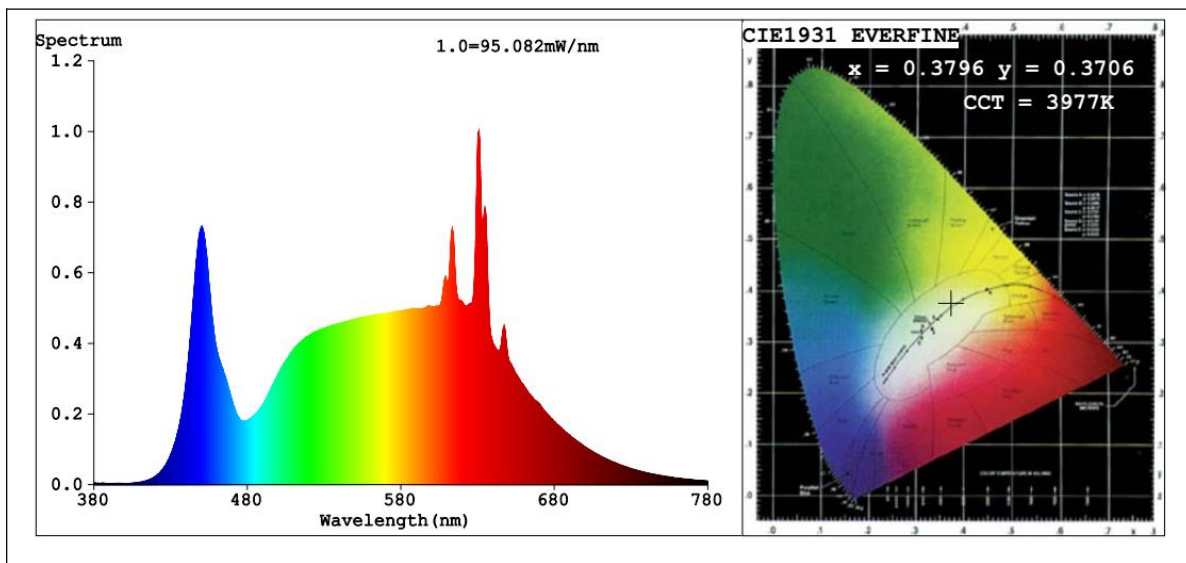
**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz )	Current (A)	Power (W)	Power Factor
JBE220104-B1	120.0	60	0.236	27.26	0.964

**Sphere-Spectroradiometer Method(Self-absorption:1.1238):**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Color Rendering Index (CRI)	94.3
R9	75
CCT (K)	3977
Duv	-0.0027
Total Luminous (lm)	2855
Luminous Efficacy (lm/W)	104.73

## Spectral Power Distribution and Chromaticity Diagram



## Colorimetric Parameters

### Color Parameters:

Chromaticity Coordinate: $x=0.3796$   $y=0.3706$ / $u'=0.2270$   $v'=0.4987$

CCT=3977K(Duv=-0.0027) Dominant WL:Ld =580.7nm WL:Lc = --nm Purity=25.1%

Ratio:R=20.5% G=75.6% B=3.9% Peak WL:Lp=630.8nm FWHM=50.1nm

Render Index:Ra=94.3 AvgR=91.5 TM30:Rf=91 Rg=102

R1 =96	R2 =96	R3 =93	R4 =95	R5 =95	R6 =93	R7 =95
R8 =91	R9 =75	R10=88	R11=94	R12=74	R13=96	R14=95 R15=95

<b>2.2.5 Electrical, Photometric and Chromaticity Measurements</b>	<b>IES LM-79 2008</b>
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Test date	2022-02-26	Test Ambient:	25.1° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	IK-DLR8L-172430-CCT (mode:5000K)	Total Operating Time (min)	90

**Electrical Measurement:**

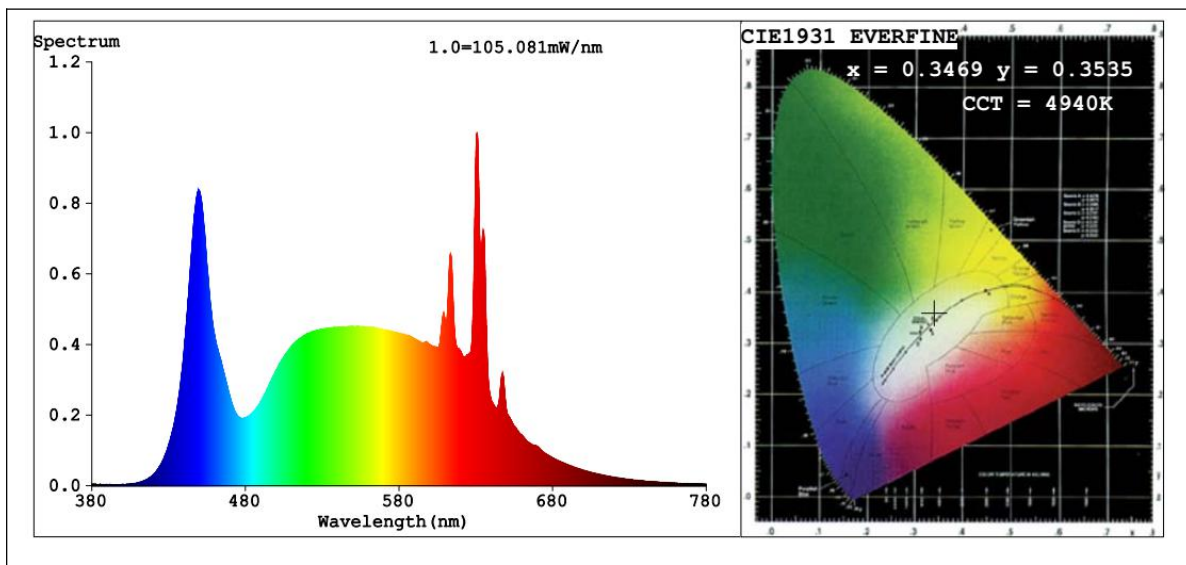
Sample No.	Voltage (Vac)	Frequency (Hz )	Current (A)	Power (W)	Power Factor
JBE220104-B1	120.0	60	0.236	27.28	0.965

**Sphere-Spectroradiometer Method(Self-absorption:1.1234):**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Color Rendering Index (CRI)	92.1
R9	68
CCT (K)	4940
Duv	0.0002
Total Luminous (lm)	2887
Luminous Efficacy (lm/W)	105.83



## Spectral Power Distribution and Chromaticity Diagram



## Colorimetric Parameters

### Color Parameters:

Chromaticity Coordinate:  $x=0.3469$   $y=0.3535$   $u'=0.2119$   $v'=0.4858$   
 CCT=4940K (Duv=0.0002) Dominant WL:Ld =573.3nm WL:Lc = --nm Purity=10.1%  
 Ratio:R=17.7% G=77.7% B=4.6% Peak WL:Lp=630.8nm FWHM=8.4nm  
 Render Index:Ra=92.1 AvgR=88.4 TM30:Rf=90 Rg=102

R1 =94	R2 =93	R3 =90	R4 =93	R5 =92	R6 =89	R7 =95
R8 =90	R9 =68	R10=82	R11=93	R12=66	R13=93	R14=94 R15=92

<b>2.2.6 Electrical, Photometric and Chromaticity Measurements</b>	<b>IES LM-79 2008</b>
--	-----------------------

<b>Test date</b>	2022-02-26	<b>Test Ambient:</b>	25.1° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	60
<b>Model Number</b>	IK-DLR8L-172430-CCT (mode:24 W/2700K)	<b>Total Operating Time (min)</b>	90

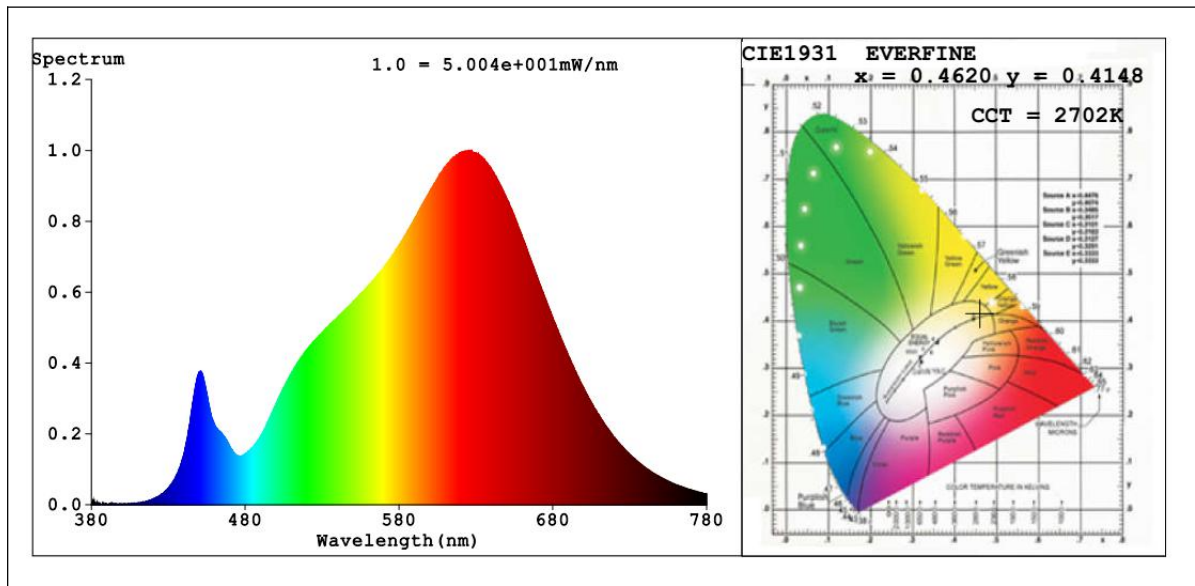
**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz )	Current (A)	Power (W)	Power Factor
JBE220104-B1	120.0	60	0.210	23.22	0.922

**Sphere-Spectroradiometer Method(Self-absorption:1.1234):**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Color Rendering Index (CRI)	92.2
R9	58
CCT (K)	2702
Duv	0.0013
Total Luminous (lm)	2084
Luminous Efficacy (lm/W)	89.75

## Spectral Power Distribution and Chromaticity Diagram



## Colorimetric Parameters

### Colorimetric Parameters

Chromaticity Coordinate:  $x=0.4620$   $y=0.4148$   $u'=0.2620$   $v'=0.5293$   $Du, Dv: -0.0004, 0.0013$

CCT=2702K ( $Duv=0.0013$ ) Dominant WL:  $Ld = 583.8\text{nm}$  Purity=63.2%

Peak WL:  $Lp=627.2\text{nm}$  FWHM=149.7nm

Render Index:  $Ra=92.2$  Render Index:  $AvgR = 89.0$

R1 =92 R2 =95 R3 =96 R4 =93 R5 =92 R6 =94 R7 =93

R8 =82 R9 =58 R10=87 R11=94 R12=80 R13=93 R14=97 R15=88

<b>2.2.7 Electrical, Photometric and Chromaticity Measurements</b>	<b>IES LM-79 2008</b>
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Test date	2022-02-26	Test Ambient:	25.1° C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	IK-DLR8L-172430-CCT (mode:17 W/2700K)	Total Operating Time (min)	90

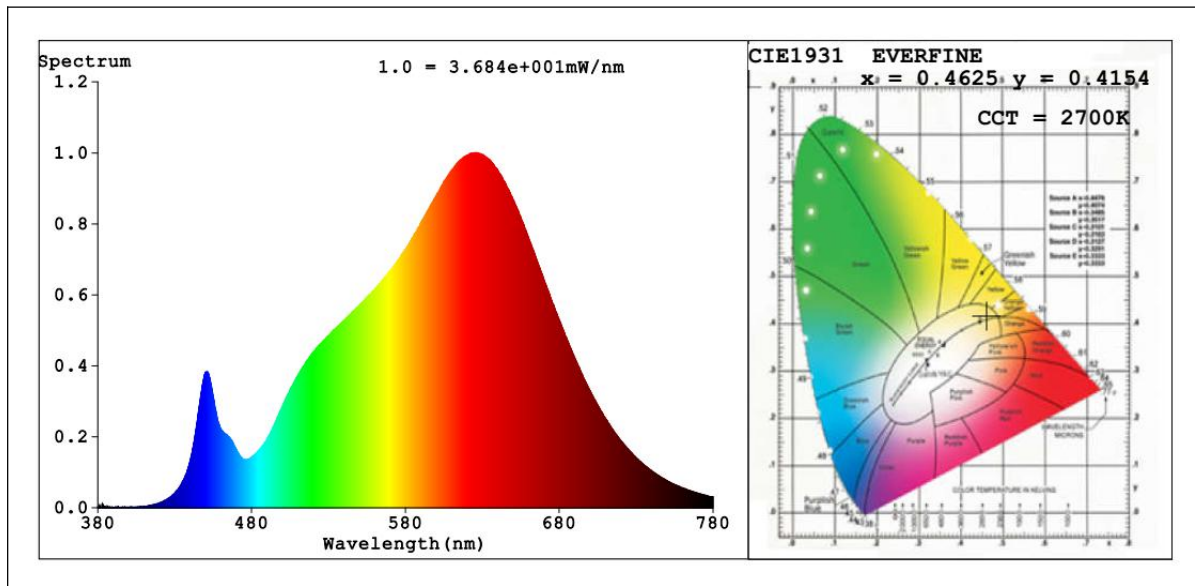
**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz )	Current (A)	Power (W)	Power Factor
JBE220104-B1	120.0	60	0.150	16.24	0.905

**Sphere-Spectroradiometer Method(Self-absorption:1.1233):**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Color Rendering Index (CRI)	92.4
R9	60
CCT (K)	2700
Duv	0.0015
Total Luminous (lm)	1493
Luminous Efficacy (lm/W)	91.93

## Spectral Power Distribution and Chromaticity Diagram



## Colorimetric Parameters

### Colorimetric Parameters

Chromaticity Coordinate:  $x=0.4625$   $y=0.4154$   $u'=0.2621$   $v'=0.5295$   $Du, Dv: -0.0004, 0.0015$

CCT=2700K ( $Duv=0.0015$ ) Dominant WL:  $Ld = 583.7nm$  Purity=63.5%

Peak WL:  $Lp=625.7nm$  FWHM=149.6nm

Render Index:  $Ra=92.4$  Render Index:  $AvgR = 89.3$

R1 =93 R2 =95 R3 =96 R4 =94 R5 =92 R6 =94 R7 =93

R8 =82 R9 =60 R10=87 R11=95 R12=80 R13=93 R14=97 R15=88



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### 2.3 Color Angular Uniformity

IES LM-79 2008

**ENERGY STAR® Program Requirements  
Product Specification for Luminaires (Light  
Fixtures) - Version 2.2**

### Test Data:

Test date	2022-02-26	Test Ambient	25.1°C
Sample No.	Maximum $\Delta u'v'$		
JBE220104-B1	0.0009		



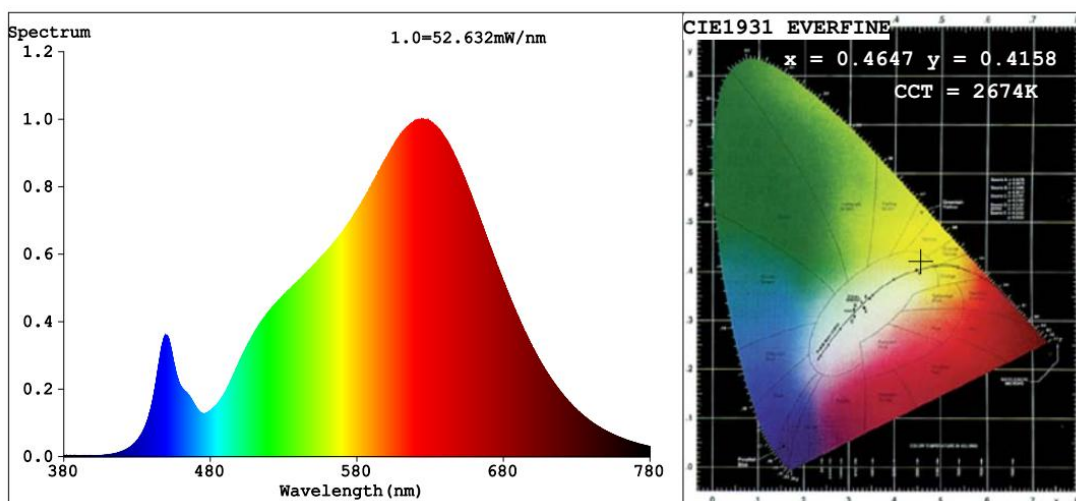
C0				C90			
gamma	$\Delta u'$	$\Delta v'$	$\Delta u'v'$	gamma	$\Delta u'$	$\Delta v'$	$\Delta u'v'$
0	-0.00022	-0.00020	0.00030	0	-0.00013	-0.00027	0.00030
1	-0.00016	-0.00018	0.00024	1	-0.00013	-0.00027	0.00030
2	-0.00016	-0.00018	0.00024	2	-0.00013	-0.00027	0.00030
3	-0.00016	-0.00018	0.00024	3	-0.00013	-0.00027	0.00030
4	-0.00016	-0.00018	0.00024	4	-0.00007	-0.00026	0.00027
5	-0.00011	-0.00022	0.00025	5	-0.00007	-0.00026	0.00027
6	-0.00016	-0.00018	0.00024	6	-0.00007	-0.00026	0.00027
7	-0.00009	-0.00017	0.00019	7	-0.00007	-0.00026	0.00027
8	-0.00009	-0.00017	0.00019	8	-0.00007	-0.00026	0.00027
9	-0.00009	-0.00017	0.00019	9	0.00000	-0.00024	0.00024
10	-0.00003	-0.00015	0.00016	10	0.00000	-0.00024	0.00024
11	-0.00003	-0.00015	0.00016	11	0.00000	-0.00024	0.00024
12	-0.00003	-0.00015	0.00016	12	0.00006	-0.00023	0.00024
13	0.00003	-0.00014	0.00014	13	0.00001	-0.00019	0.00019
14	0.00003	-0.00014	0.00014	14	0.00001	-0.00019	0.00019
15	0.00010	-0.00012	0.00016	15	0.00008	-0.00018	0.00019
16	0.00016	-0.00011	0.00020	16	0.00014	-0.00016	0.00022
17	0.00016	-0.00011	0.00020	17	0.00014	-0.00016	0.00022
18	0.00012	-0.00007	0.00014	18	0.00014	-0.00016	0.00022
19	0.00018	-0.00006	0.00019	19	0.00021	-0.00015	0.00025
20	0.00018	-0.00006	0.00019	20	0.00023	-0.00009	0.00025
21	0.00018	-0.00006	0.00019	21	0.00023	-0.00009	0.00025
22	0.00025	-0.00004	0.00025	22	0.00029	-0.00008	0.00030
23	0.00025	-0.00004	0.00025	23	0.00029	-0.00008	0.00030
24	0.00027	0.00001	0.00027	24	0.00029	-0.00008	0.00030
25	0.00031	-0.00003	0.00031	25	0.00036	-0.00006	0.00036
26	0.00033	0.00003	0.00033	26	0.00037	-0.00001	0.00037
27	0.00033	0.00003	0.00033	27	0.00037	-0.00001	0.00037
28	0.00033	0.00003	0.00033	28	0.00037	-0.00001	0.00037
29	0.00039	0.00004	0.00040	29	0.00037	-0.00001	0.00037
30	0.00039	0.00004	0.00040	30	0.00044	0.00000	0.00044
31	0.00039	0.00004	0.00040	31	0.00007	-0.00003	0.00008
32	0.00046	0.00006	0.00046	32	0.00007	-0.00003	0.00008
33	0.00046	0.00006	0.00046	33	0.00009	0.00002	0.00010
34	0.00041	0.00009	0.00042	34	0.00009	0.00002	0.00010
35	0.00041	0.00009	0.00042	35	0.00009	0.00002	0.00010
36	0.00041	0.00009	0.00042	36	0.00009	0.00002	0.00010
37	0.00048	0.00011	0.00049	37	0.00016	0.00003	0.00016
38	0.00041	0.00009	0.00042	38	0.00016	0.00003	0.00016
39	0.00041	0.00009	0.00042	39	0.00016	0.00003	0.00016
40	0.00041	0.00009	0.00042	40	0.00016	0.00003	0.00016
41	0.00041	0.00009	0.00042	41	0.00016	0.00003	0.00016
42	0.00041	0.00009	0.00042	42	0.00016	0.00003	0.00016
43	0.00035	0.00008	0.00036	43	0.00009	0.00002	0.00010
44	0.00035	0.00008	0.00036	44	0.00009	0.00002	0.00010
45	0.00009	0.00002	0.00010	45	0.00007	-0.00003	0.00008
46	0.00009	0.00002	0.00010	46	0.00003	0.00000	0.00003
47	0.00003	0.00000	0.00003	47	0.00001	-0.00005	0.00005
48	-0.00003	-0.00001	0.00004	48	-0.00005	-0.00006	0.00008
49	-0.00003	-0.00001	0.00004	49	-0.00012	-0.00008	0.00014

C180				C270			
gamma	$\Delta u'$	$\Delta v'$	$\Delta u'v'$	gamma	$\Delta u'$	$\Delta v'$	$\Delta u'v'$
0	-0.00022	-0.00020	0.00030	0	-0.00013	-0.00027	0.00030
1	-0.00022	-0.00020	0.00030	1	-0.00013	-0.00027	0.00030
2	-0.00027	-0.00016	0.00031	2	-0.00013	-0.00027	0.00030
3	-0.00020	-0.00015	0.00025	3	-0.00013	-0.00027	0.00030
4	-0.00020	-0.00015	0.00025	4	-0.00013	-0.00027	0.00030
5	-0.00020	-0.00015	0.00025	5	-0.00018	-0.00024	0.00030
6	-0.00020	-0.00015	0.00025	6	-0.00018	-0.00024	0.00030
7	-0.00020	-0.00015	0.00025	7	-0.00018	-0.00024	0.00030
8	-0.00020	-0.00015	0.00025	8	-0.00011	-0.00022	0.00025
9	-0.00020	-0.00015	0.00025	9	-0.00011	-0.00022	0.00025
10	-0.00025	-0.00011	0.00027	10	-0.00011	-0.00022	0.00025
11	-0.00025	-0.00011	0.00027	11	-0.00016	-0.00018	0.00024
12	-0.00018	-0.00009	0.00021	12	-0.00009	-0.00017	0.00019
13	-0.00023	-0.00006	0.00023	13	-0.00009	-0.00017	0.00019
14	-0.00012	-0.00008	0.00014	14	-0.00003	-0.00015	0.00016
15	-0.00016	-0.00004	0.00017	15	-0.00003	-0.00015	0.00016
16	-0.00016	-0.00004	0.00017	16	-0.00007	-0.00012	0.00014
17	-0.00016	-0.00004	0.00017	17	-0.00007	-0.00012	0.00014
18	-0.00014	0.00001	0.00014	18	-0.00001	-0.00010	0.00010
19	-0.00014	0.00001	0.00014	19	-0.00001	-0.00010	0.00010
20	-0.00014	0.00001	0.00014	20	0.00005	-0.00009	0.00010
21	-0.00008	0.00003	0.00008	21	0.00005	-0.00009	0.00010
22	-0.00008	0.00003	0.00008	22	0.00001	-0.00005	0.00005
23	-0.00012	0.00006	0.00014	23	0.00007	-0.00003	0.00008
24	-0.00012	0.00006	0.00014	24	0.00007	-0.00003	0.00008
25	-0.00006	0.00008	0.00010	25	0.00007	-0.00003	0.00008
26	-0.00010	0.00012	0.00016	26	0.00009	0.00002	0.00010
27	-0.00010	0.00012	0.00016	27	0.00014	-0.00002	0.00014
28	-0.00010	0.00012	0.00016	28	0.00009	0.00002	0.00010
29	-0.00047	0.00008	0.00048	29	0.00009	0.00002	0.00010
30	-0.00045	0.00013	0.00047	30	0.00009	0.00002	0.00010
31	-0.00040	0.00009	0.00042	31	0.00009	0.00002	0.00010
32	-0.00045	0.00013	0.00047	32	0.00016	0.00003	0.00016
33	-0.00039	0.00015	0.00041	33	0.00011	0.00007	0.00013
34	-0.00045	0.00013	0.00047	34	0.00005	0.00006	0.00007
35	-0.00045	0.00013	0.00047	35	0.00005	0.00006	0.00007
36	-0.00043	0.00018	0.00047	36	0.00005	0.00006	0.00007
37	-0.00043	0.00018	0.00047	37	-0.00002	0.00004	0.00004
38	-0.00043	0.00018	0.00047	38	0.00005	0.00006	0.00007
39	-0.00043	0.00018	0.00047	39	-0.00002	0.00004	0.00004
40	-0.00049	0.00017	0.00052	40	-0.00002	0.00004	0.00004
41	-0.00049	0.00017	0.00052	41	-0.00002	0.00004	0.00004
42	-0.00060	0.00019	0.00063	42	-0.00008	0.00003	0.00008
43	-0.00056	0.00015	0.00058	43	-0.00038	0.00000	0.00038
44	-0.00056	0.00015	0.00058	44	-0.00038	0.00000	0.00038
45	-0.00062	0.00014	0.00064	45	-0.00040	-0.00005	0.00040
46	-0.00069	0.00012	0.00070	46	-0.00046	-0.00006	0.00047
47	-0.00075	0.00011	0.00076	47	-0.00046	-0.00006	0.00047
48	-0.00081	0.00009	0.00082	48	-0.00055	-0.00013	0.00056
49	-0.00088	0.00008	0.00088	49	-0.00061	-0.00015	0.00063



<b>2.4 Electrical and Photometric Measurements, with dimming</b>	<b>IES LM-79 2008 ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2</b>
<b>Noted: The noise test and data are not covered by A2LA accreditation</b>	

Test date	2022-02-26		Test Ambient:	25.1° C
Dimmer Technology			0-10V	
Sample No.			Maximum Level	Minimum Level
JBE220104-B1	Input:	Light outout(Lumen)	2389	115.2
	120.0V / 60Hz	Percentage	97.87%	4.82%



### Color Parameters:

Chromaticity Coordinate: x=0.4647 y=0.4158/u'=0.2633 v'=0.5300  
CCT=2674K (Duv=0.0015) Dominant WL: Ld = 583.9nm WL: Lc = --nm Purity=64.3%  
Ratio: R=26.5% G=71.5% B=2.1% Peak WL: Lp=624.1nm FWHM=146.3nm  
Render Index: Ra=91.9 AvgR=88.7 TM30: Rf=92 Rg=100

R1 =92 R2 =95 R3 =96 R4 =93 R5 =91 R6 =94 R7 =93  
R8 =81 R9 =57 R10=87 R11=94 R12=81 R13=92 R14=97 R15=87

The luminaires [can] ~~lean not~~ provide less than 20% of total light output with continuous dimmer.

Dimming Way	Peak Noise Reading (dBA)	Test Condition	Distance between the microphone and the UUT
0-10V	19.3	Dimmer adjusted to lowest light output	< 1 m



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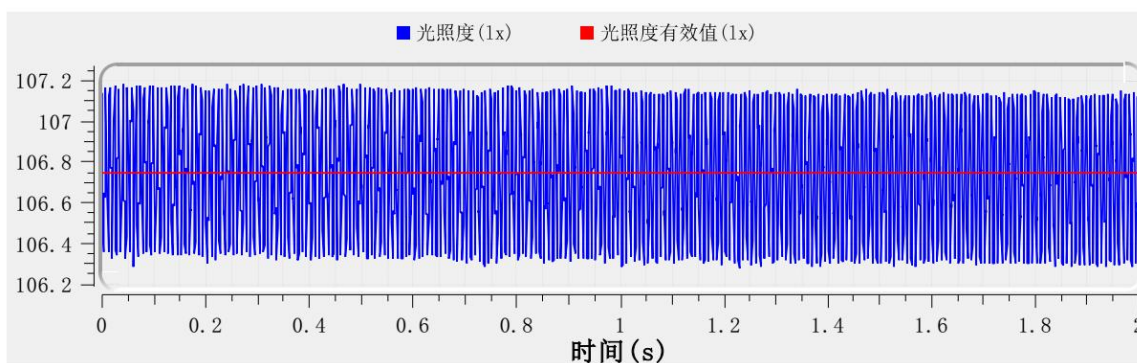
<b>2.5 Flicker</b>	<b>NEMA 77-2017 ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2</b>
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<b>Dimming Technology</b>	0-10V
<b>Dimmer</b>	--
<b>Sample No.</b>	JBE220104-B1

Item	Short Term Flicker Indicator (Pst)	Stroboscopic Visibility Measure (SVM)
<b>Maximum light output</b>	0.038	0.011
<b>50% light output</b>	0.400	0.013
<b>Minimum light output</b>	0.000	0.000

2.6 Operating Frequency	ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2
Noted: This test and data are not covered by A2LA accreditation	

Test date	2022-02-26	Test Ambient:	25.1° C
Sample No.	Operating Frequency (Hz)		
JBE220104-B1	120.000		



## 2.7 Starting Time

### ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2

Test date	2022-02-26	Test Ambient:	25.1° C
Sample No.	Start Time (ms)		
JBE220104-B1	42		

### Graph (Start Time):





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<b>2.8 Transient Protection Test</b>	<b>ANSI/IEEE C62.41 ENERGY STAR® Program Requirements for Luminaires – Version 2.2</b>
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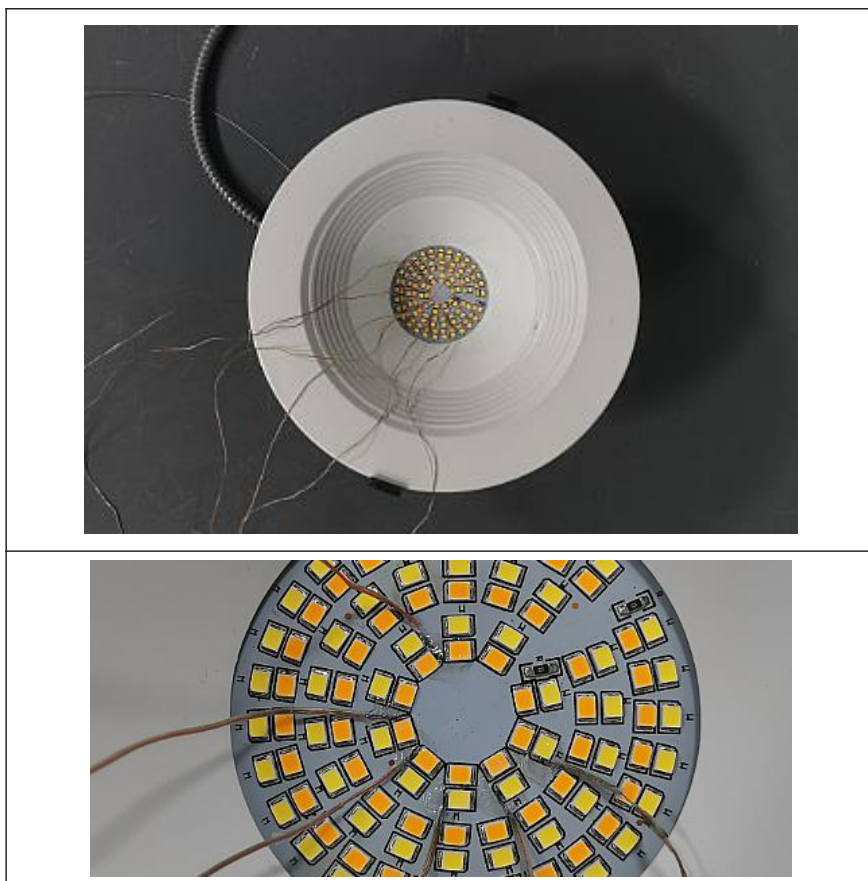
## **Test voltage: 120V,60Hz**

<b>Test date</b>	<b>2022-02-26</b>	<b>Test Ambient</b>	<b>25.1° C</b>
<b>Sample No.</b>		<b>Transient Protection Test - Seven Strikes</b>	
JBE220104-B1		Survival	

<b>2.9 In-Situ Temperature Measurement Test (ISTMT)</b>	<b>ANSI/UL 1598:2008</b>
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Test date	2022-02-26	Test Ambient	25.1° C
Input Vol./Frequency	120.0V / 60Hz	Output Current of Single LED(mA)	150
Sample No.	LED Package Model	Maximum Measured LED Ts Point Temperature (°C)	Maximum permitted Ts temperature for L70 $\geq$ 50,000 hrs (°C)
JBE220104-B1	HL-AS-2835HW-2C-S1-08-PCT-HR3	75.2	105

**In-Situ Picture - Ts:**





<b>2.10 Maximum Measured Ballast or Driver Case Temperature</b>	<b>ANSI/UL 1598:2008</b>
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Test date	2022-02-26	Test Ambient	25.1° C
Sample No.	Maximum Measured Driver Case Temperature (°C)	Maximum Driver Case Temperature Limited (°C)	
JBE220104-B1	54.7	105	

**In-Situ Picture - Ts:**





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<b>2.11 Standby Power Consumption:</b>	<b>ENERGY STAR® Program Requirements Product Specification for Luminaires (Light Fixtures) - Version 2.2</b>
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<b>Test date</b>	2022-02-26	<b>Test Ambient:</b>	25.1° C
<b>Model Number</b>	IK-DLR8L-172430-CCT	<b>Stabilization Time (min)</b>	60

## Electrical Measurement – when the luminaires turned off:

<b>Sample No.</b>	<b>Standby Power Consumption(W):</b>
JBE220104-B1	0





### 3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-S-451	2 meter Integrating Sphere	Verified by D204 standard lamp	
ST-R-S-455	Spectral analysis system HAAS-1200	Verified by D204 standard lamp	
ST-R-S-452	Standard Lamp D204	2021-04-15	2022-04-14
ST-R-S-453	Power Meter for Integrating Sphere	2021-04-08	2022-04-06
ST-R-S-407	Goniophotometer system	Verified by S1530039 standard lamp	
ST-R-S-410	Standard Lamp S1530039	2021-04-15	2022-04-14
ST-R-S-408	Power Meter for Goniophotometer	2021-04-08	2022-04-06
ST-R-S-027	Digital Luxmeter	2021-04-08	2022-04-07
ST-R-S-016	Oscillograph	2021-04-08	2022-04-06
ST-R-S-017	Probe	2021-04-08	2022-04-07
ST-R-361	ZLB61012X	2021-08-18	2022-08-17
ST-R-414	LFA-3000	2021-12-17	2022-12-16
Uncertainty: Photometric Measurement (Sphere): 2.72%, k=2 Chromaticity Measurement (Sphere): 43.60K, k=2 Photometric Measurement (Goniophotometer): 3.44%, k=2			

\*\*\*\*\* END OF DATASHEET PACKAGE \*\*\*\*\*