

**CEC Title 24 (CEC-400-2018-021-CMF 2019**  
**REFERENCE APPENDICES JA8 and JA10) Test Report**  
For  
**LEDVANCE LLC**  
**(Brand Name: LEDVANCE, SYLVANIA)**

200 BALLARDVALE STREET WILMINGTON, MA 01887

**Model name(s):**  
**LEDLD2A1200ST9SC3WH**

**Type of  
Luminaire:** Downlights

**Report Date:** 2022-02-16  
Ningbo TengLi Testing Co., Ltd

**Prepared By:** 2nd floor, Block B, Ningbo Testing and Certification Base,  
No. 66 Qingyi Road, Ningbo National Hi-Tech Zone,  
Ningbo, Zhejiang

Test & Report By:

*Nick Song*

Engineer: Nick Song

Review By:

*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 any agency of the  
Federal Government.

1.1 Product Information:	
Model Number	LEDLD2A1200ST9SC3WH
Remark	N/A
Representative (Tested) Model	LEDLD2A1200ST9SC3WH
Model Difference	N/A
SKU (if available)	N/A
Type of Lamp	Downlights
LED Manufacturer	Bridgelux, Inc
LED Model	BXFN-27G-13H-98
Dimming	Dimmable
Sample Number	STD211233NB-C1-C3

1.2 Rated Values:		
Rated Voltage / Frequency	120Vac, 60Hz	
Nominal Power	16W	
Rated Initial Lamp Lumen	--	
Dimming range	10%-100%	
Target Replacement Wattage	--	
Declared CCT	2700K/3000K/3500K/4000K/5000K	
Luminaire Aperture (for Downlight)	8	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Product Photo



### 1.3 Test Specifications:

Date of Receipt	Jan.18,2022
Date of Test	Jan.19,2022
1.Test Method according to 10 CFR 430 Appendix BB to Subpart B, Uniform Test Method for Measuring the Input Power, Lumen Output, Lamp Efficacy, Correlated Color Temperature (CCT), Color Rendering Index (CRI), Power Factor, Time to Failure, and Standby Mode Power of Integrated Light-Emitting Diode (LED) Lamps	
2.Standards used: IES LM-84-14 Approved Method for Measuring Luminous Flux and Color Maintenance of LED Downlight Retrofits, Light Engines, and Luminaires	
3.The ambient temperature during maintenance test of the DUT between photometric measurements shall be maintained at 25°C ± 5°C. Humidity: < 65 RH. Airflow shall be minimized.	
4. Supply rated input voltage (e.g. 120V) and frequency (60Hz) to the samples. Branch circuit input voltage shall be regulated to within ≤ 2% of the rated rms value. The input voltage to each DUT or driver shall be verified periodically.	
5. Conduct minimum 6000 hours life test, conduct LM-79 test measurement in 1000-hour interval.	
6. At each measurement interval, the DUT shall be taken off the test racks and measured per IES LM-79-08 for electrical, photometric, and colorimetric characteristics. After measurement, the DUT shall be placed back on the test rack for the next cycle if required.	
7. Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25° C ± 1° 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.	
8. Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at 25° C ± 1° 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.	
9. Off state power measurement – accordance to IEC 62301	

## 2.1 Summary of Test Result

Criteria Item	Requirement	Measured Value	Status			
Light Source Type	LED, OLED, Fluorescent, HID, Incandescent, Other	LED	Pass			
Product type	Omnidirectional lamp, Directional lamp, Decorative lamp, LED light engine, inseparable SSL luminaire,T20 lamp, other	Downlights	Pass			
Luminous Efficacy	$\geq 45$ lumens/Watt	78.49lm/W	Pass			
Power Factor	$\geq 0.90$	0.9022	Pass			
Start time	$\leq 0.5$ sec	136ms	Pass			
Correlated Color Temperature (CCT)	For inseparable SSL luminaires, LED light engines and GU24 LED lamps, $\leq 4000$ Kelvin. For all other sources, $\leq 3000$ Kelvin.	2738K	Pass			
Duv	--	0.0016	Pass			
Color Rendering Index (CRI)	$\geq 90$	92.6	Pass			
Color Rendering R9 (red)	$\geq 50$	63	Pass			
LM-80 and TM-21 Projected Time to L70	$\geq 25,000$ hours, or N/A for light sources providing 6,000 hour lumen maintenance testing	<table><tr><td>50,000</td></tr><tr><td>86.39%</td></tr><tr><td>&gt;72000</td></tr></table>	50,000	86.39%	>72000	Pass
50,000						
86.39%						
>72000						
Rated life	$\geq 15,000$ hours	50000	Pass			
Standby Power Consumption	Luminaires shall not draw power in the off state.	See the data sheet	Pass			
Minimum dimming level	$\leq 10\%$	See Below Test Data	Pass			
Audible Noise	$\leq 24$ dBA	See Below Test Data	Pass			

### 2.2.1 Initial Electrical and Light Output Measurement

(Refer to Work Instruction QD25)

[ ✓ ] IES LM-79 (2008)

[ ✓ ] ANSI C82.2:2002

Test date	2022-01-19	Test Ambient:	25.0 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	LEDLD2A1200ST9SC3WH /2700K setting		

### Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
STD211233NB-C1	120.0	60	0.1427	15.45	0.9022

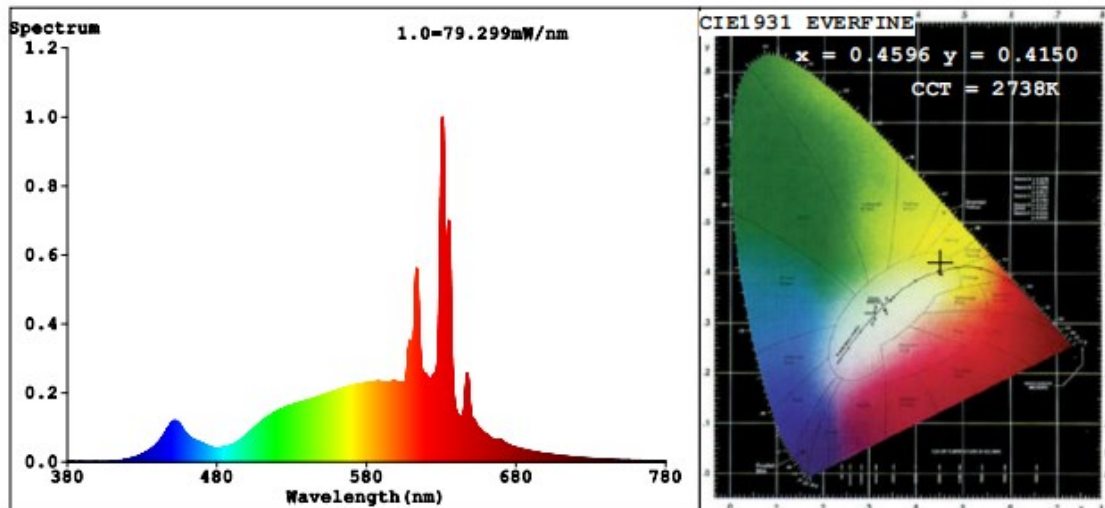
### Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2738
Duv	0.0016
Chromaticity (x, y)	x=0.4596 y=0.4150
Chromaticity (u', v')	u'=0.2604 v'=0.5290
Color Rendering Index (CRI)	92.6
R9	63

### Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
Total Luminous (lm)	1212.6
Luminous Efficacy (lm/W)	78.47
Beam Angle (°)	108.3
Center Beam Candle Power (cd)	424

## Spectral Power Distribution & Chromaticity Diagram



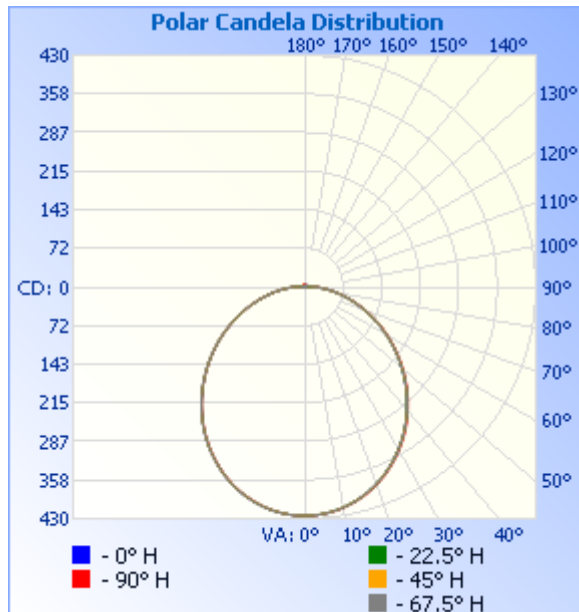
R1 =95   R2 =94   R3 =91   R4 =95   R5 =93   R6 =94   R7 =94  
R8 =86   R9 =63   R10=83   R11=95   R12=77   R13=94   R14=93   R15=91

## Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	%Luminaire
0-30	325.0	26.8%
0-40	527.9	43.5%
0-60	919.4	75.8%
60-90	278.0	22.9%
70-100	143.0	11.8%
90-120	9.9	0.8%
0-90	1,197.4	98.8%
90-180	15.1	1.2%
0-180	1,212.5	100%

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-10	40.1	3.3%	90-100	8.0	0.7%
10-20	114.1	9.4%	100-110	1.0	0.1%
20-30	170.9	14.1%	110-120	1.0	0.1%
30-40	202.8	16.7%	120-130	1.2	0.1%
40-50	206.8	17.1%	130-140	1.6	0.1%
50-60	184.7	15.2%	140-150	1.1	0.1%
60-70	143.0	11.8%	150-160	0.6	0.1%
70-80	91.4	7.5%	160-170	0.5	0%
80-90	43.6	3.6%	170-180	0.1	0%

## Photometric Data



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	1.47 fc	46.9 ft	47.2 ft
34.0ft	0.37 fc	93.8 ft	94.4 ft
51.0ft	0.16 fc	140.7 ft	141.6 ft
68.0ft	0.09 fc	187.6 ft	188.8 ft
85.0ft	0.06 fc	234.5 ft	236.0 ft
102.0ft	0.04 fc	281.4 ft	283.3 ft

■ Vert. Spread: 108.1°  
■ Horiz. Spread: 108.5°

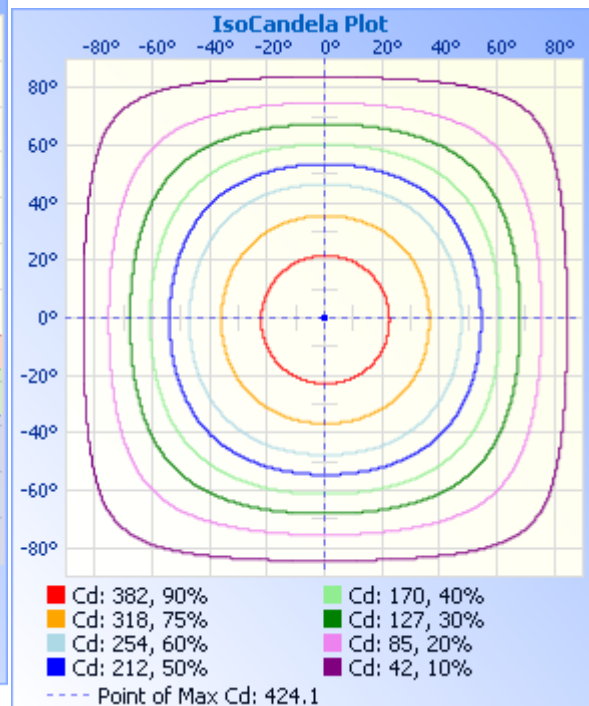
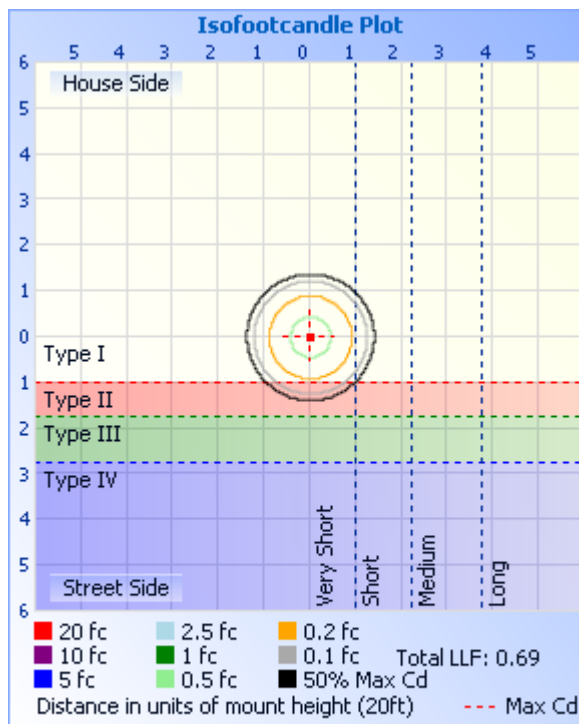




Table--1

UNIT: cd

C (DEG) Y (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	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424			
5	422	422	422	421	422	422	422	422	422	422	422	422	422	422	422	422			
10	415	415	415	415	415	415	415	415	416	416	416	416	416	416	415	416			
15	404	404	404	404	404	404	404	404	405	405	405	405	405	405	405	405			
20	389	389	389	389	389	389	389	389	390	390	390	390	390	390	390	390			
25	371	371	370	370	370	370	370	371	372	372	372	372	372	372	372	372			
30	349	349	348	348	348	348	348	349	350	350	350	350	350	350	350	350			
35	324	324	323	323	323	323	324	324	325	325	325	325	325	325	325	326			
40	297	296	296	296	296	296	296	297	298	298	298	298	298	298	298	298			
45	268	267	267	267	267	267	267	268	269	269	269	269	269	269	269	269			
50	238	237	237	236	236	237	237	238	239	239	239	238	238	238	239	239			
55	206	206	206	205	205	206	206	207	208	208	207	207	207	207	207	208			
60	175	175	174	174	174	175	175	176	177	176	176	175	175	175	176	176			
65	144	144	143	143	144	144	144	145	146	146	145	144	144	144	144	145			
70	114	114	114	114	114	114	115	115	116	116	115	114	114	114	114	115			
75	85.5	85.6	85.6	85.8	86.1	86.3	86.7	86.9	87.5	87.1	86.4	85.8	85.4	85.4	85.7	86.1			
80	60.2	60.3	60.4	60.5	60.7	60.9	61.3	61.6	62.0	61.6	61.0	60.5	60.1	60.1	60.4	60.7			
85	38.8	39.0	39.0	38.9	39.1	39.3	39.7	39.8	40.1	39.8	39.4	39.0	38.8	38.7	39.0	39.2			
90	22.2	22.1	21.9	21.8	21.9	22.0	22.2	22.3	22.8	22.6	22.4	22.1	22.2	22.3	22.4	22.6			
95	1.22	3.46	0.07	10.3	7.84	9.50	0.02	1.77	0.46	0.00	0.00	4.58	0.08	12.1	0.00	0.00			
100	0.28	0.78	0.11	3.33	3.49	3.24	0.08	0.17	0.30	0.18	1.21	4.06	4.46	3.92	0.13	0.26			
105	2.35	1.79	0.15	0.05	0.05	0.05	0.11	1.34	1.91	1.05	0.15	0.01	0.02	0.02	0.16	1.94			
110	1.78	1.51	0.58	0.30	0.11	0.31	0.52	0.94	1.36	1.43	0.49	0.28	0.14	0.32	0.46	1.78			
115	1.66	1.51	1.05	0.70	0.41	0.68	0.91	1.13	1.46	1.53	1.32	0.61	0.32	0.66	1.07	1.73			
120	1.76	1.67	1.30	0.53	0.78	0.63	1.28	1.44	1.42	1.59	1.74	0.51	0.66	0.40	1.47	1.80			
125	1.95	2.03	1.66	0.16	0.51	0.80	1.66	1.97	1.74	1.64	1.65	0.13	0.01	0.76	1.55	1.74			
130	2.41	2.37	1.95	0.64	1.11	0.57	1.94	2.41	2.26	2.01	1.78	0.67	1.01	0.71	1.74	2.18			
135	2.83	3.74	1.62	1.52	1.27	0.75	1.62	5.67	3.06	4.18	1.35	1.99	1.03	1.05	1.31	2.75			
140	2.94	2.27	2.28	1.74	1.42	1.95	2.09	2.88	2.76	2.22	1.60	1.87	1.40	1.83	1.19	2.86			
145	2.86	1.95	0.57	1.91	1.58	1.97	0.64	2.24	2.38	1.87	0.64	0.54	0.81	0.51	0.36	1.75			
150	2.38	2.07	0.60	2.02	1.73	2.03	0.49	2.15	4.41	3.98	0.88	1.47	0.65	1.84	4.48	0.81			
155	0.80	0.33	0.89	1.65	1.83	1.47	0.58	0.42	0.73	0.71	2.62	1.99	1.14	0.86	2.13	0.95			
160	2.19	2.07	0.29	0.53	0.76	0.51	0.29	1.97	2.21	2.18	2.43	2.26	1.63	1.58	2.18	2.22			
165	4.10	4.56	0.89	0.62	0.54	0.69	0.81	4.24	3.99	4.30	3.02	1.64	1.51	1.59	1.77	2.73			
170	1.75	2.25	0.27	1.48	1.82	1.16	0.41	1.35	2.01	2.10	1.74	1.42	1.78	1.82	1.30	1.40			
175	1.20	0.83	0.43	0.53	0.66	0.61	0.23	0.85	1.24	1.25	1.36	1.23	1.26	1.32	1.16	0.92			
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			



### 2.2.2 Initial Electrical and Light Output Measurement

(Refer to Work Instruction QD25)

[ ✓ ] IES LM-79 (2008)

[ ✓ ] ANSI C82.2:2002

Test date	2022-01-19	Test Ambient:	25.0 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	LEDLD2A1200ST9SC3WH /3000K setting		

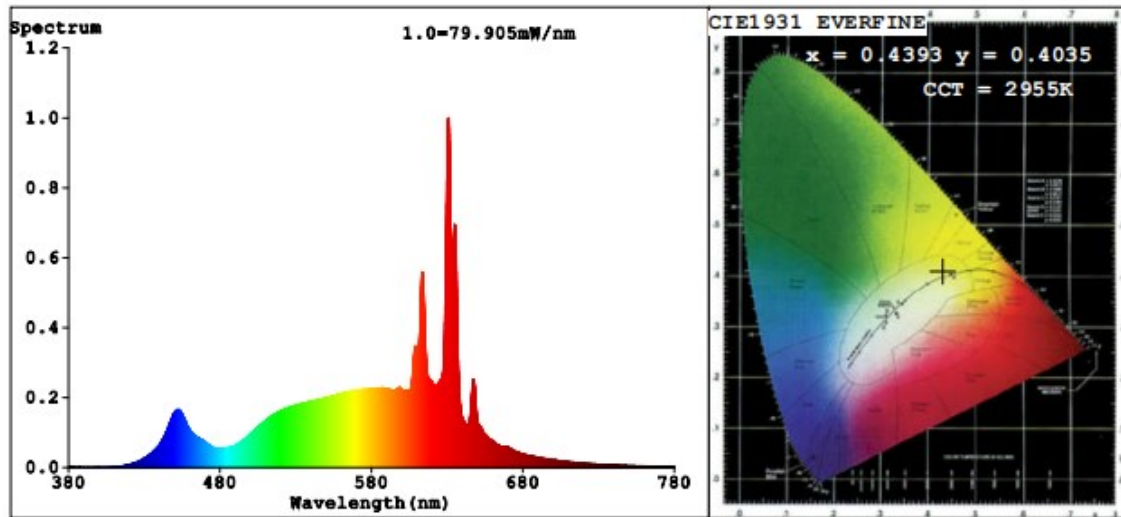
### Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
STD211233NB-C1	120.0	60	0.1401	15.30	0.9103

### Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2955
Duv	-0.0006
Chromaticity (x, y)	x=0.4393 y=0.4035
Chromaticity (u', v')	u'=0.2524 v'=0.5215
Color Rendering Index (CRI)	95.2
R9	76
Total Luminous (lm)	1247
Luminous Efficacy (lm/W)	81.5

Spectral Power Distribution & Chromaticity Diagram



R1 =99	R2 =97	R3 =92	R4 =96	R5 =97	R6 =96	R7 =95	
R8 =91	R9 =76	R10=88	R11=95	R12=80	R13=98	R14=93	R15=95

### 2.2.3 Initial Electrical and Light Output Measurement

(Refer to Work Instruction QD25)

[ ✓ ] IES LM-79 (2008)

[ ✓ ] ANSI C82.2:2002

Test date	2022-01-19	Test Ambient:	25.0 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	LEDLD2A1200ST9SC3WH /3500K setting		

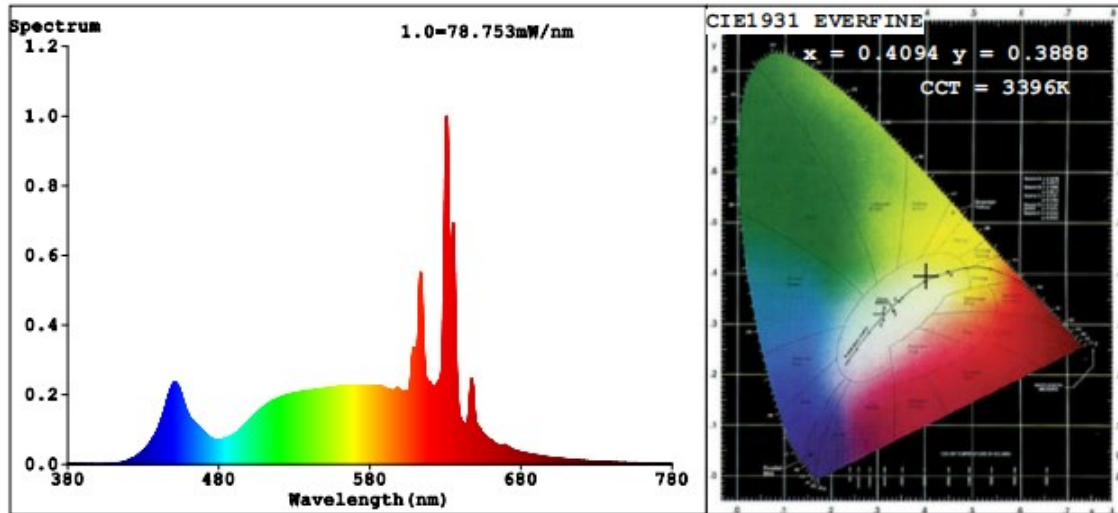
### Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
STD211233NB-C1	120.0	60	0.1382	15.17	0.9146

### Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3396
Duv	-0.0017
Chromaticity (x, y)	x=0.4094 y=0.3888
Chromaticity (u', v')	u'=0.2392 v'=0.5111
Color Rendering Index (CRI)	96.3
R9	91
Total Luminous (lm)	1295
Luminous Efficacy (lm/W)	85.37

Spectral Power Distribution & Chromaticity Diagram



R1 =98	R2 =97	R3 =91	R4 =94	R5 =99	R6 =96	R7 =97		
R8 =98	R9 =91	R10=91	R11=92	R12=81	R13=100	R14=93	R15=100	

### 2.2.4 Initial Electrical and Light Output Measurement

(Refer to Work Instruction QD25)

[ ✓ ] IES LM-79 (2008)

[ ✓ ] ANSI C82.2:2002

Test date	2022-01-19	Test Ambient:	25.0 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	LEDLD2A1200ST9SC3WH /4000K setting		

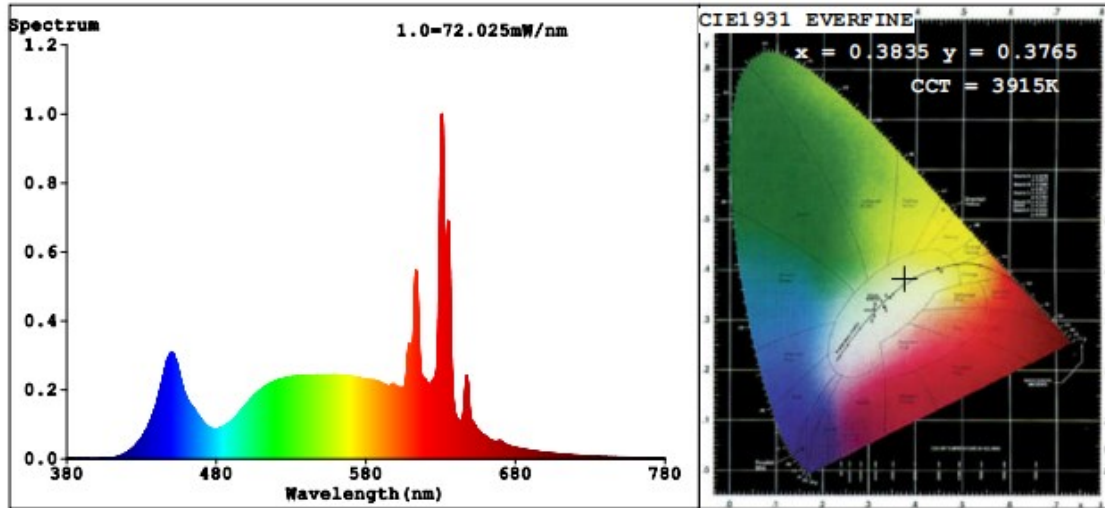
### Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
STD211233NB-C1	120.0	60	0.1392	15.23	0.9120

### Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3915
Duv	-0.0010
Chromaticity (x, y)	x=0.3835 y=0.3765
Chromaticity (u', v')	u'=0.2273 v'=0.5019
Color Rendering Index (CRI)	95.3
R9	98
Total Luminous (lm)	1276
Luminous Efficacy (lm/W)	83.77

Spectral Power Distribution & Chromaticity Diagram



R1 =98	R2 =97	R3 =89	R4 =93	R5 =99	R6 =95	R7 =96	
R8 =97	R9 =98	R10=89	R11=91	R12=78	R13=99	R14=92	R15=98

<b>2.2.5 Initial Electrical and Light Output Measurement</b> (Refer to Work Instruction QD25)	[ ✓ ] IES LM-79 (2008) [ ✓ ] ANSI C82.2:2002
--	---

<b>Test date</b>	2022-01-19	<b>Test Ambient:</b>	25.0 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	LEDLD2A1200ST9SC3WH /5000K setting		

**Electrical Measurement:**

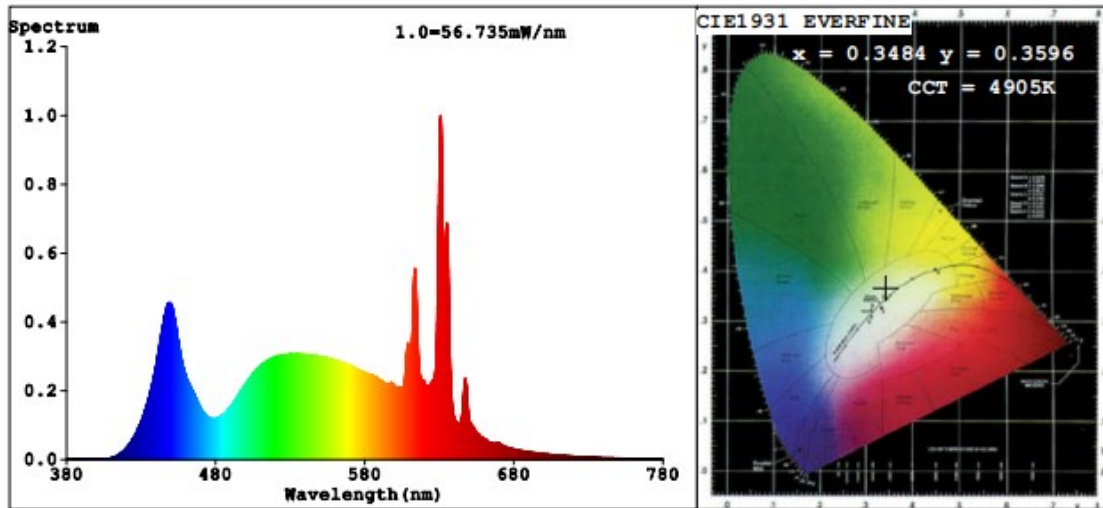
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
STD211233NB-C1	120.0	60	0.1423	15.37	0.9001

**Chromaticity Measurement - Sphere-Spectroradiometer Method:**

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4956
Duv	0.0027
Chromaticity (x, y)	x=0.3484 y=0.3596
Chromaticity (u', v')	u'=0.2106 v'=0.4890
Color Rendering Index (CRI)	93.6
R9	98
Total Luminous (lm)	1236
Luminous Efficacy (lm/W)	80.40



Spectral Power Distribution & Chromaticity Diagram



R1 =99	R2 =94	R3 =86	R4 =93	R5 =96	R6 =91	R7 =94	
R8 =96	R9 =98	R10=83	R11=91	R12=72	R13=97	R14=92	R15=99

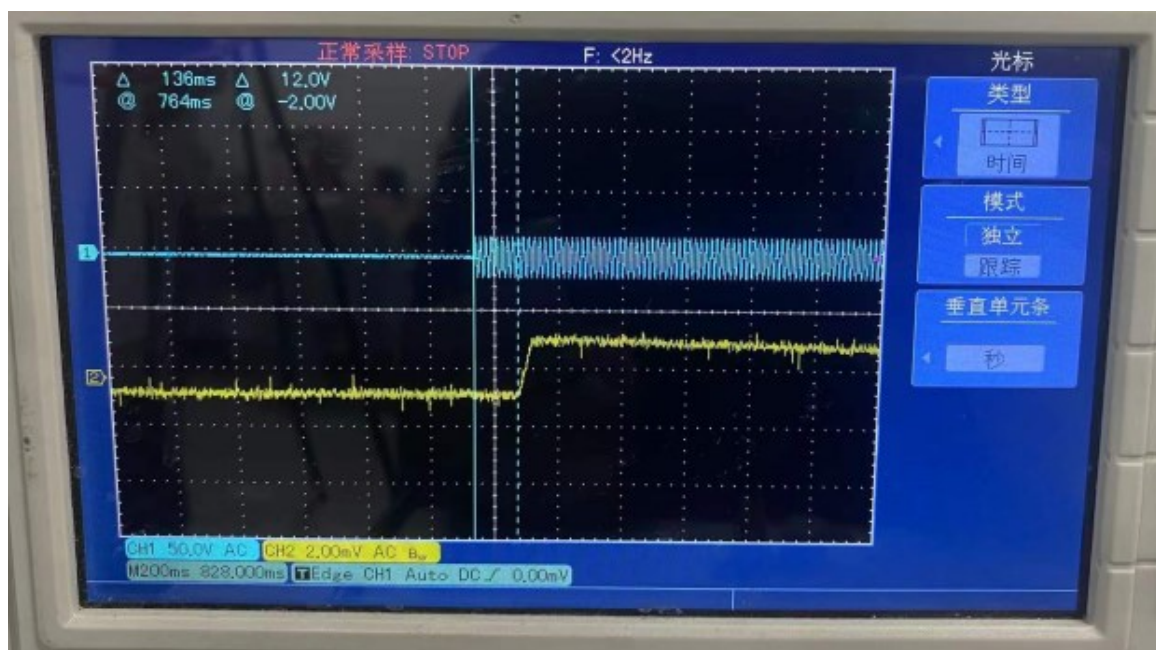
### 2.3 Start Time Test

Test date	2022-01-19	Test Ambient:	25±1 °C
Test Orientation	As intended	Stabilization Time (min)	45
Model Number	LEDLD2A1200ST9SC3WH		

### Electrical Measurement:

Sample No.	Start Time (ms)
STD211233NB-C1	136
STD220128NB-B2	133
STD220128NB-B3	130
Average	133

### Graph (Start Time):



## 2.4 In-Situ Temperature Measurement Test (ISTMT)

Test date	2022-01-19	Test Ambient:	25.1 °C
Test Orientation	As intended	Stabilization Time (min)	45
Model Number	LEDLD2A1200ST9SC3WH		

### Electrical Measurement:

Input Vol./Frequency	120 V / 60 Hz		Output Current of Single LED(mA)	93.00mA	
Sample No.	LED Package Model	Maximum Measured LED Ts Point Temperature (°C)	Maximum LED Ts Point Temperature Limited (°C)	Maximum Measured LED Driver Td Point Temperature (°C)	Maximum LED Driver Td Point Temperature Limited (°C)
STD211233NB-C1	BXFN-27G-13H-98	72.3	105	93.8	105
STD211233NB-C2		72.0		93.5	
STD211233NB-C3		72.6		93.1	

## Results

Time (t) at which to estimate lumen maintenance (hours):	50,000
Lumen maintenance at time (t) (%):	86.39%
Reported L70 (hours):	>72000

## 2.5 Dimming, Reduced Flicker Operation and Audible Noise

Test date	2022-01-19	Test Ambient:	25±1 ° C
Test Orientation	As intended	Stabilization Time (min)	45
Model Number	LEDLD2A1200ST9SC3WH		

### Electrical Measurement:

Dimmer Model	LUTRON MACL-153M		
Sample No.	Input	Dimming (100%)	Dimming (<10%)
		Luminous flux (lm)	Luminous flux (lm)
STD211233NB-C1	120.0 V / 60 Hz	1191	17.33
STD220128NB-C2	120.0 V / 60 Hz	1193	18.01
STD220128NB-C3	120.0 V / 60 Hz	1194	18.45
		Dimming (100%)	Dimming (20%)
Sample No.	Input	Peak Noise Reading (dBA)	Peak Noise Reading (dBA)
STD211233NB-C1	120.0 V / 60 Hz	18.9	20.8
STD220128NB-C2	120.0 V / 60 Hz	19.2	20.1
STD220128NB-C3	120.0 V / 60 Hz	19.3	20.3

### Flicker Result:

Dimming Level	100% Dimming Level	20% Dimming Level	Nominal Dimming Level
Percent Flicker (Unfiltered)	8.417%	3.845%	22.094%
Percent Flicker (1000Hz cut-off)	7.866%	2.934%	7.012%
Percent Flicker (400Hz cut-off)	5.719%	2.537%	6.719%
Percent Flicker (200Hz cut-off)	3.825%	2.314%	5.772%
Percent Flicker (90Hz cut-off)	0.289%	2.123%	5.443%
Percent Flicker (40Hz cut-off)	0.260%	2.119%	5.113%

### 3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-702	2 meter Integrating Sphere	Verified by D204 standard lamp	
ST-R-701	Spectral analysis system HAAS-1200	Verified by D204 standard lamp	
ST-R-703	Standard Lamp D204	2022-01-14	2023-01-13
ST-R-704	Power Meter for Integrating Sphere	2022-01-03	2023-01-02
ST-R-714	Goniophotometer system	Verified by D908S standard lamp	
ST-R-710	Standard Lamp D908S	2022-01-14	2023-01-13
ST-R-711	Power Meter for Goniophotometer	2022-01-03	2023-01-02
ST-R-725	LFA-3000	2022-01-03	2023-01-02
Uncertainty(K=2): Photometric Measurement (Sphere):3.94% Chromaticity Measurement(Sphere):48.2K Photometric Measurement(Goniophotometer):3.96%			

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