Original Data

Relevant Standards

☑IES LM-79-2008
☑ANSI C82.77:2014

Prepared For

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Project Number

Data Number

Test Date
2020/9/10

1.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2020/9/10	PLL-13.5-850-DIR	A1
2	Goniophotometer Test	2020/9/10	PLL-13.5-850-DIR	A1
3	THD and PF Test	2020/9/10	PLL-13.5-850-DIR	A1

1.1 Test Summary

Requirement Category	Test Method	Requirements		Test value
Integrating Sphere system				
Power (W)	IES LM-79-2008	16.5 ±10%		15.91
Lamp Output for bare lamp (lm)	IES LM-79-2008	2100 ±10%		2119.6
Lamp Efficacy (lm/W)	IES LM-79-2008	> 114.5		132.9
Allowable CCTs* (K)	IES LM-79-2008	7 step	5029 ± 283	4872
		4 step	5029 ± 220	
		7 step	3985±275	
		4 step	3985±154	
		7 step	3465±245	
		4 step	3465±124	
		7 step	3045±175	
		4 step	3045±100	
CRI	IES LM-79-2008 CIE 13.3-1995	>80		82.0
R9	IES LM-79-2008 CIE 13.3-1995	>0		7
Rf	ANSI/IES TM-30-18	>70		83
Rg	ANSI/IES TM-30-18	>89		96
Rcs,h1	ANSI/IES TM-30-18	Rcs=>-12%,h1<=23%		
Power Factor	ANSI C82.77:2014	>0.9		0.94
Total Harmonic Distortion (A%)	ANSI C82.77:2014	<25%		19.54%
Goniophotometer system				
Lamp Output (lm)	IES LM-79-2008	2100 ±10%		2216.3
Luminaire Efficacy(lm/W)	IES LM-79-2008	> 114.5		135.1
Beam Angle	IES LM-79-2008			116.9

2.0 Production Description

Luminaire Description: PLL-13.5-850-DIR

Electrical Specification: 120V~277V,50/60HZ

Light source:

Manufacturer Of Light Source: Seoul Semiconductor Co.,LTD

Photos of Luminaire Characteristics

3.0 LM-79 Measurement and Test Results

3.1 Integrating Sphere Test

Model No.	PLL-13.5-850-DIR	Sample ID.	A1
Opreate time (Min.)	15	Stabilization time (Min.)	15
Temperature（℃）	25.3	Humidity %	55

Test Method
The samples were tested according to the IES LM-79-2008. Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º 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 voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load. The sample was measured using 4π geometry and 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.

Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Flux (lm)	Efficacy (lm/W)
25.3	120.00	60.00	0.268	15.910	0.9852	2119.6	133.2
25.3	277.02	60.00	0.130	16.100	0.9407	2139.0	132.9

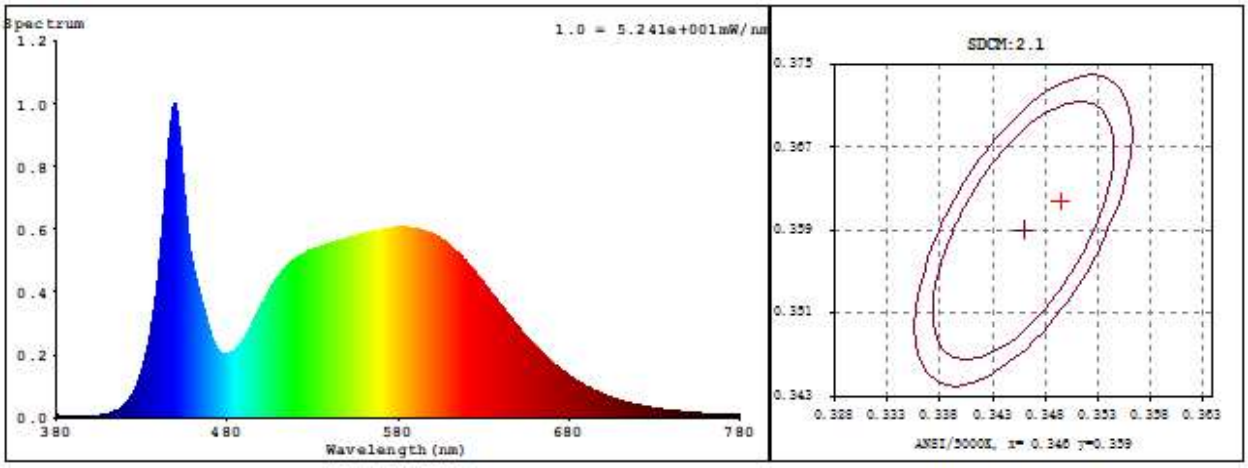
Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
4872	3.2E-03	83	96	82	7.0	2.1
4872	3.2E-03	83	96	82	7.0	2.1

3.1 Integrating Sphere Test

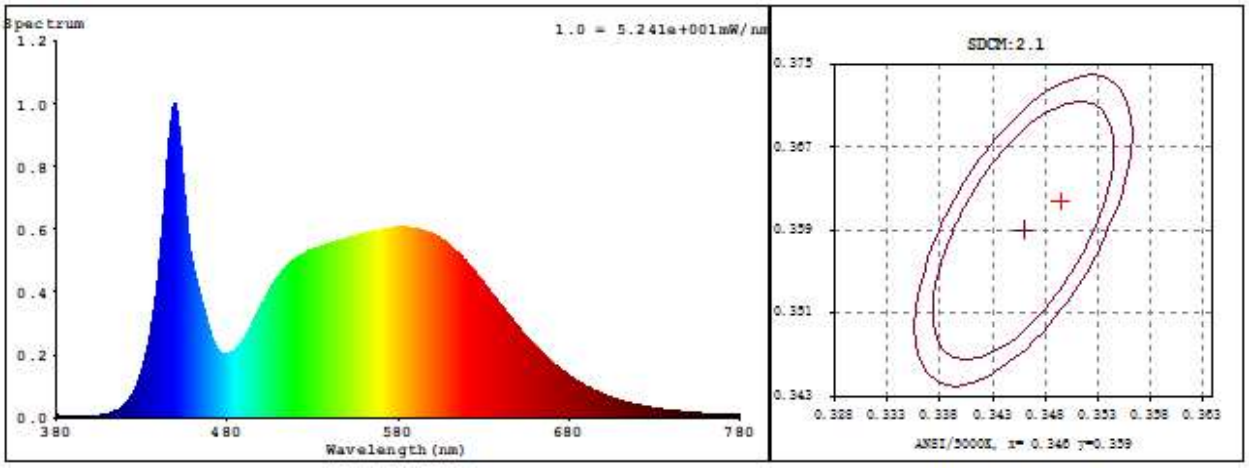
Spectroradiometric Parameters

120V



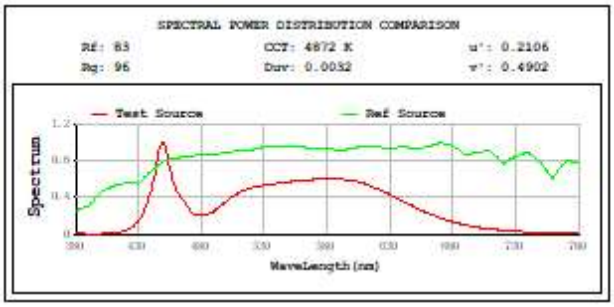
R1 =80	R2 =86	R3 =91	R4 =82	R5 =80	R6 =81	R7 =88	
R8 =68	R9 =7	R10=67	R11=81	R12=56	R13=81	R14=95	R15=75

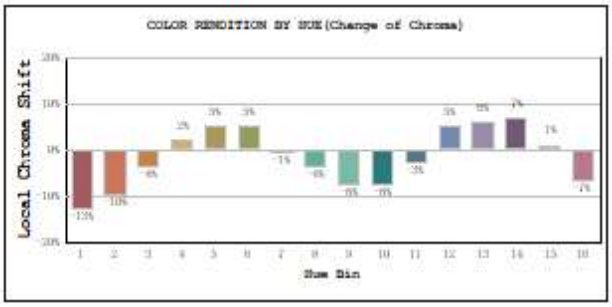
277V

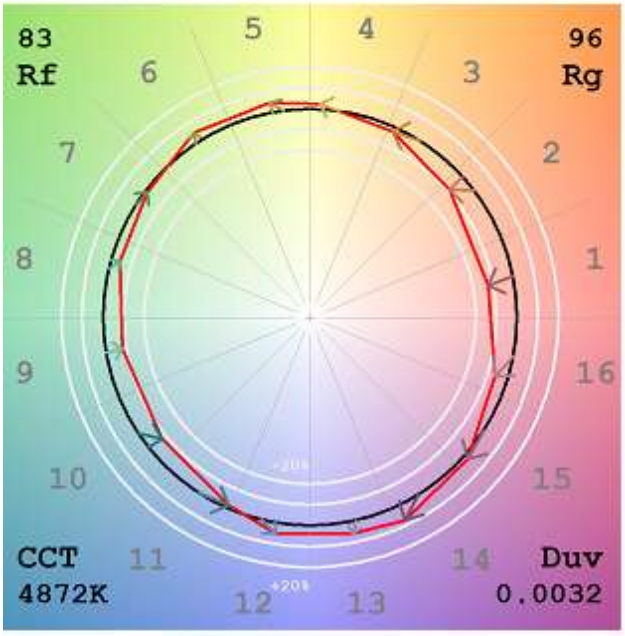


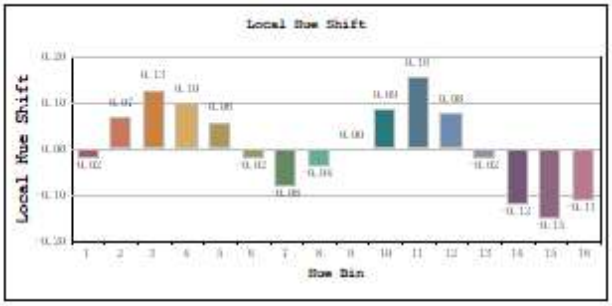
R1 =80	R2 =86	R3 =91	R4 =82	R5 =80	R6 =81	R7 =88	
R8 =68	R9 =7	R10=67	R11=81	R12=56	R13=81	R14=95	R15=75

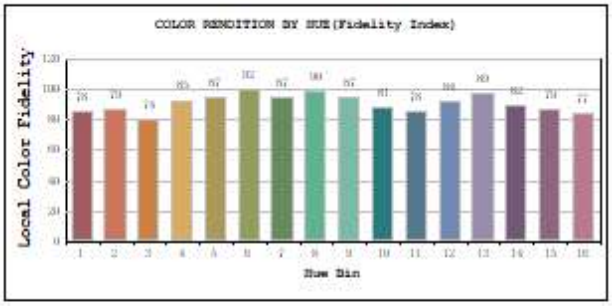
3.2 Integrating Sphere Test - Minimum CCT

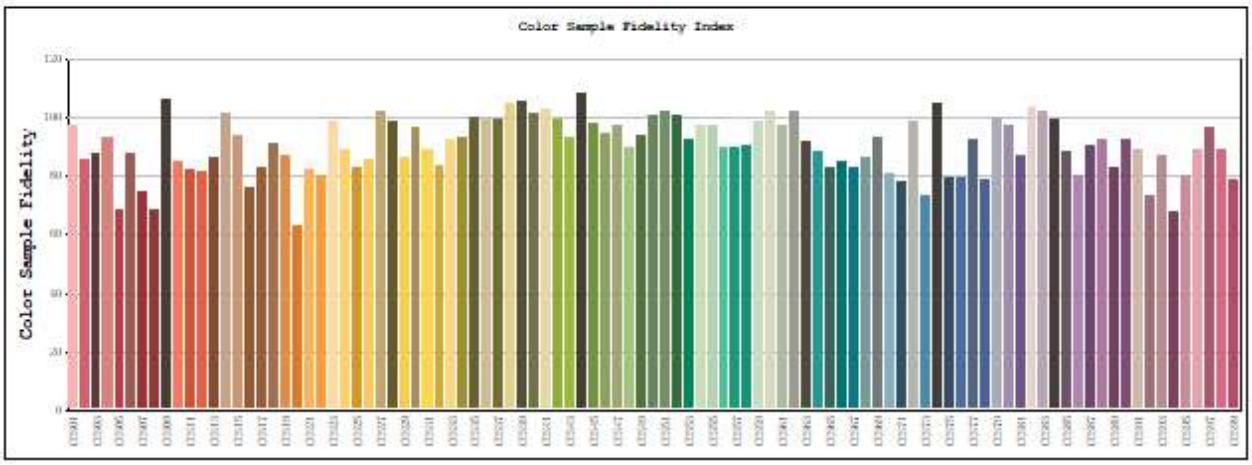












3.3 Goniophotometer Test

Model No.	PLL-13.5-850-DIR	Sample ID.	0
Opreate time (Min.)	15	Stabilization time (Min.)	15

Test Method
The samples were tested according to the IES LM-79-2008. Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C + 1º 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 voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load. The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 0.5o vertical intervals and 10o horizontal intervals.

Test Conditions

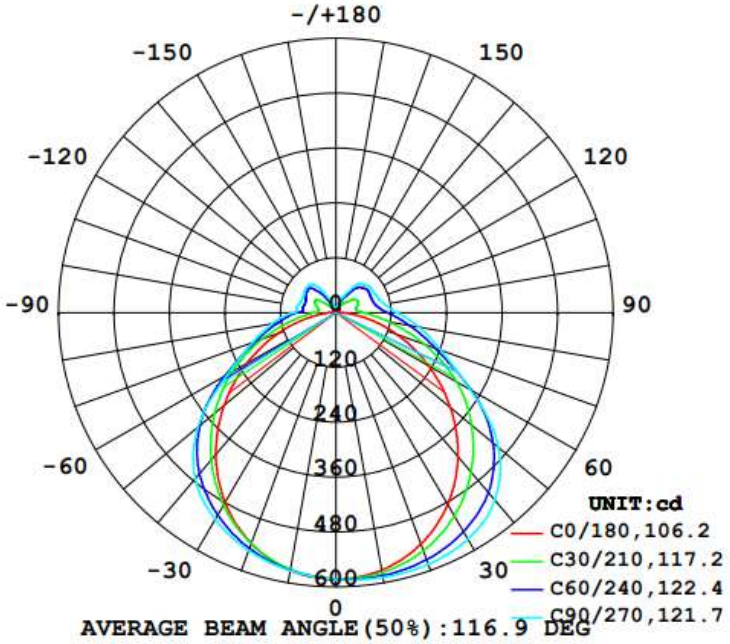
Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
25.3	120.00	60.00	0.276	16.4	0.985

Test Result

Flux(lm)	Beam Angle	Zonal Lumen Requirement(0°-60°)	SC (0°-180°)	SC (90°-270°)	Efficacy (lm/W)
2216.3	116.9	63.1%	1.46	1.24	135.1

3.3 Goniophotometer Test

Light Distrubtion Curve



Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt	Zone	Lumens
0-20	215.48	9.70	9.70	0-10	55.32
0-30	463.13	20.90	20.90	10-20	160.16
0-40	770.09	34.70	34.70	20-30	247.64
0-60	1397.62	63.10	63.00	30-40	306.96
0-80	1795.18	81.00	80.90	40-50	327.48
0-90	1898.74	85.70	85.60	50-60	300.05
10-90	1843.42	83.20	83.10	60-70	233.86
20-40	554.61	25.00	25.00	70-80	163.70
20-50	882.09	39.80	39.80	80-90	103.56
40-70	861.39	38.90	38.80	90-100	68.33
60-80	397.56	17.90	17.90	100-110	61.70
70-80	163.70	7.40	7.40	110-120	58.41
80-90	103.56	4.70	4.70	120-130	52.55
90-110	130.03	5.90	5.90	130-140	40.16
90-120	188.44	8.50	8.50	140-150	23.37
90-130	240.98	10.90	10.90	150-160	10.23
90-150	304.51	13.70	13.70	160-170	4.29
90-180	320.13	14.40	14.40	170-180	1.09
110-180	190.10	8.60	8.60		
0-180	2218.87	100.10	100.00		

5.0 THD and PF Test

Model No.	PLL-13.5-850-DIR	Sample ID.	A1
Temperature（℃）	25.3	Humidity %	49

Test Method
The samples were tested according to the ANSI C82.77:2002. The total harmonic distortion shall be measured to the 40th order. The ambient temperature condition was maintained at 25º C ± 1º C. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
25.3	120.00	60.00	0.268	15.9	0.985	9.94%
25.3	277.02	60.00	0.130	16.1	0.941	19.54%