

# Photometric Test Report

## Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77:2017

## Prepared For RAB Lighting Inc.

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## Project Number

**DLF2212110**

## Report Number

**DLF2212110-5a**

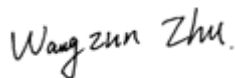
## Test Date

**2023/1/3**

## Issue Date

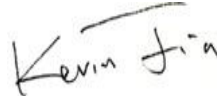
**2023/1/5**

### Prepared By



Wangzun Zhu

### Approved By



Kevin Jia

The results contained in this report pertain only to the tested sample.

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## 1.0 Test Summary

DLC Technical Requirements v5.1

Indoor - Linear Ambient - Direct Linear Ambient Luminaires				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	750		2088
Lumen/ft (Goniophotometer - Section 4.2)	IES LM-79-2008	≥375		1044
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 115	Premium 130	141.0
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		14.8
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	5.25%
		20.00%	277V	9.16%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.995
		0.9	277V	0.943
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3985±275	4128
		4 step	3985±154	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥80		85
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥0		14
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		84
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		93
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-12%≤IES Rcs,h1≤+23%		-11%
Zonal Lumen Requirement (0°-60°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≥40%		72.17%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22		22.4
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		277
(Goniophotometer - Section 4.2)		Non-Wroست Case		120
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		0.057
(Goniophotometer - Section 4.2)		Non-Wroست Case		0.121
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		14.8
(Goniophotometer - Section 4.2)		Non-Wroست Case		14.4

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023/1/3	GUSJR2/15W/4000K	E1
2	Goniophotometer Test	2023/1/3	GUSJR2/15W/4000K	E1
3	THD and PF Test	2023/1/3	GUSJR2/15W/4000K	E1

### Remark(If any)

1、 This report shall not be used by the client to claim product endorsement by NVLAP, NIST or any agency of the US government.

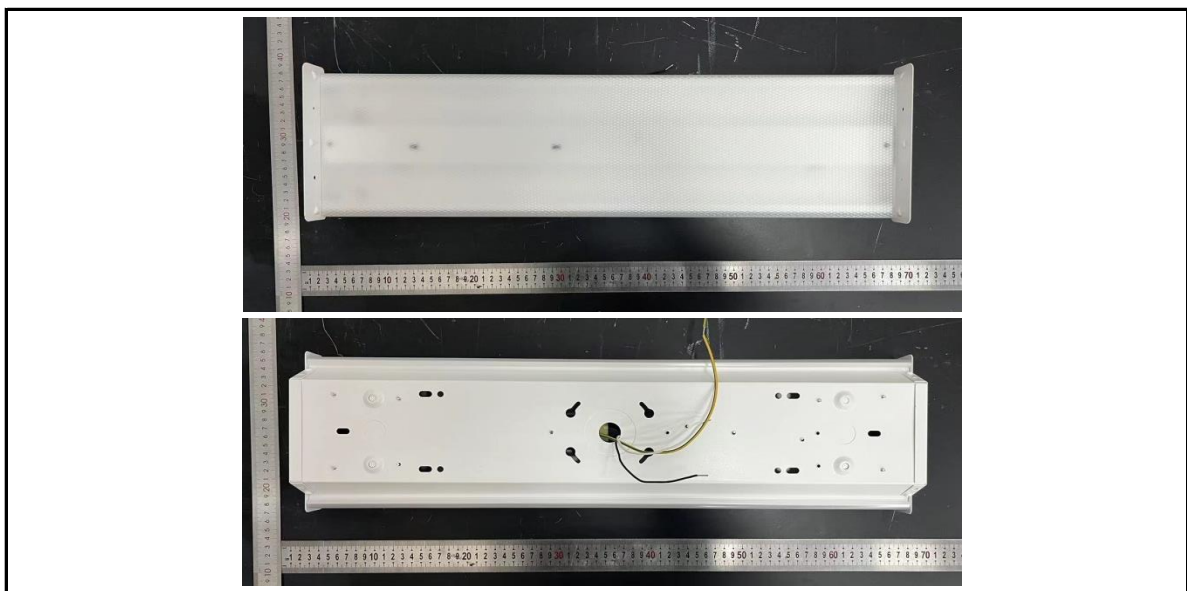
2、 The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.

## 3.0 Production Description

**Luminaire Description:** GUSJR2/15W/4000K

**Electrical Specification:** 120V-277V,50/60HZ

### Photos of Luminaire Characteristics



## 4.0 LM-79 Measurement and Test Results

### 4.1 Integrating Sphere Test

Model No.	GUSJR2/15W/4000K	Sample ID.	E1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	56.0

#### Test Method

The samples were tested according to the IES LM-79-2008.

Photometric 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 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  $\pm 0.2$  percent under load.

The sample was measured using  $4\pi$  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 Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
119.96	60	0.120	14.3	0.995
277.03	60	0.056	14.7	0.943

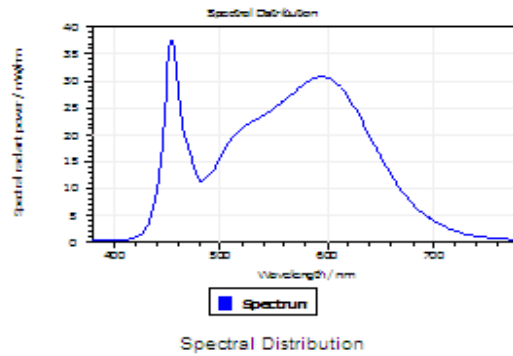
#### Test Result

CCT (K)	CRI	R9	Duv
4128	85	14	0.0015

Rf	Rg	IES Rcs,h1
84	93	-11%

## 4.1 Integrating Sphere Test

### Results

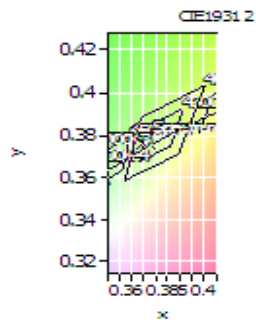


#### Spectral values

DominantWavelength 577.73 nm  
Purity 0.260  
PeakWavelength 454.30 nm  
Radiant Power 5.521 W  
Width50%:

#### Color Coordinates

Correlated Color Temperat 4128 K  
x: 0.3759 u: 0.2220 u': 0.2220  
y: 0.3771 v: 0.3340 v': 0.5010  
CRI01 83.4 CRI09 14.2  
CRI02 92.4 CRI10 81.4  
CRI03 96.2 CRI11 81.2  
CRI04 81.7 CRI12 62.0  
CRI05 83.1 CRI13 86.1  
CRI06 88.8 CRI14 98.5  
CRI07 85.5 CRI15 76.7  
CRI08 65.5 CRI16 72.6  
ResultsCRI 84.6



PlanckDistance 1.5E-003

## 4.1 Integrating Sphere Test

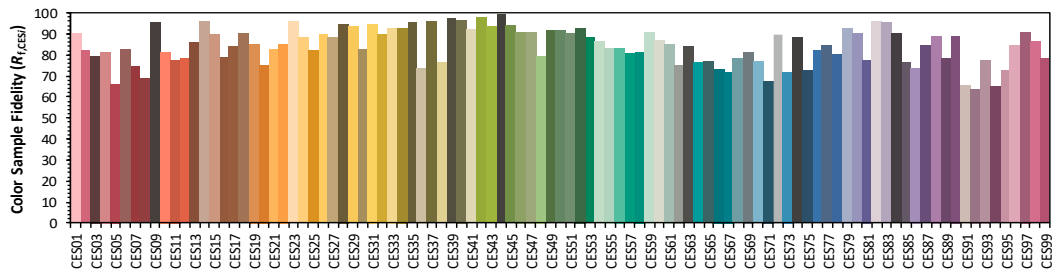
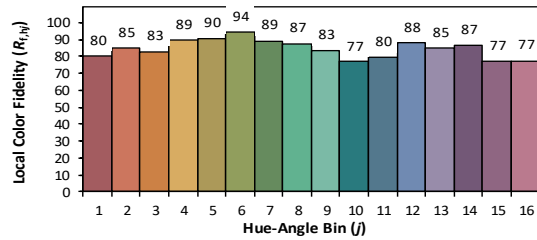
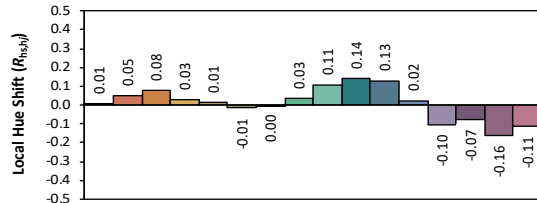
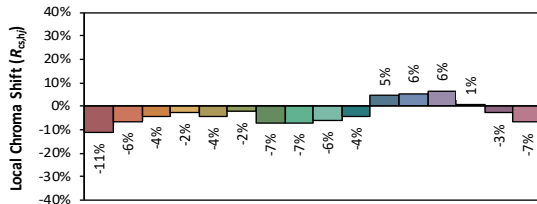
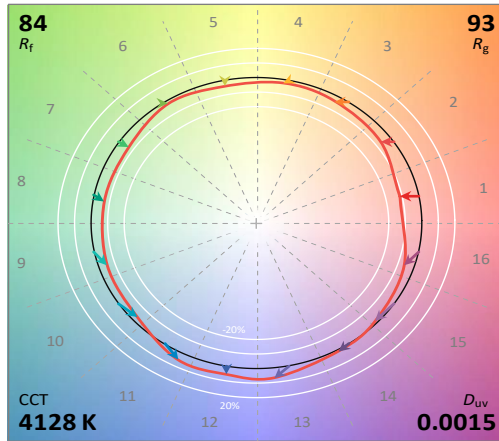
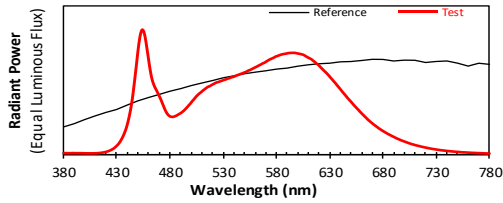
### IES TM-30-18 Color Rendition Report

Source: DLF2212110-5a

Manufacturer: RAB Lighting Inc.

Date: 2023/1/3

Model: GUSJR2/15W/4000K



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

$x$  0.3759  
 $y$  0.3770  
 $u'$  0.2220  
 $v'$  0.5010

CIE 13.3-1995  
(CRI)

$R_a$  85  
 $R_9$  20

## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

Model No.	GUSJR2/15W/4000K	Sample ID.	E1
Opreate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	54.0

#### Test Method

The samples were tested according to the IES LM-79-2008.

Photometric paramters were measured using a type C 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 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  $\pm 0.2$  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  $0.5^{\circ}$  vertical intervals and  $10^{\circ}$  horizontal intervals.

#### Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WROST CASE	276.94	60	0.057	14.8	0.938
NON-WROST CASE	119.98	60	0.121	14.4	0.990

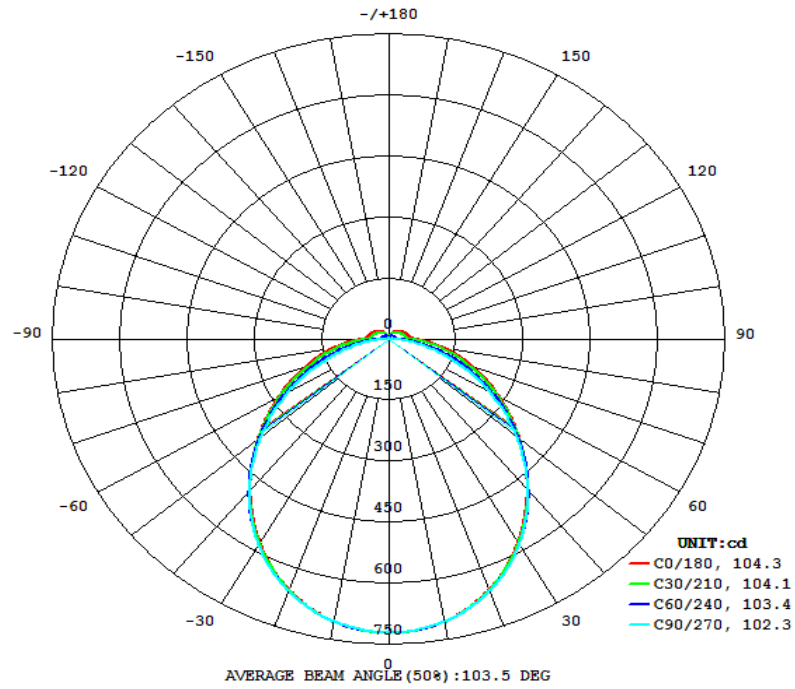
#### Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
2088	175.5	158.2	104.3	102.3	141.0

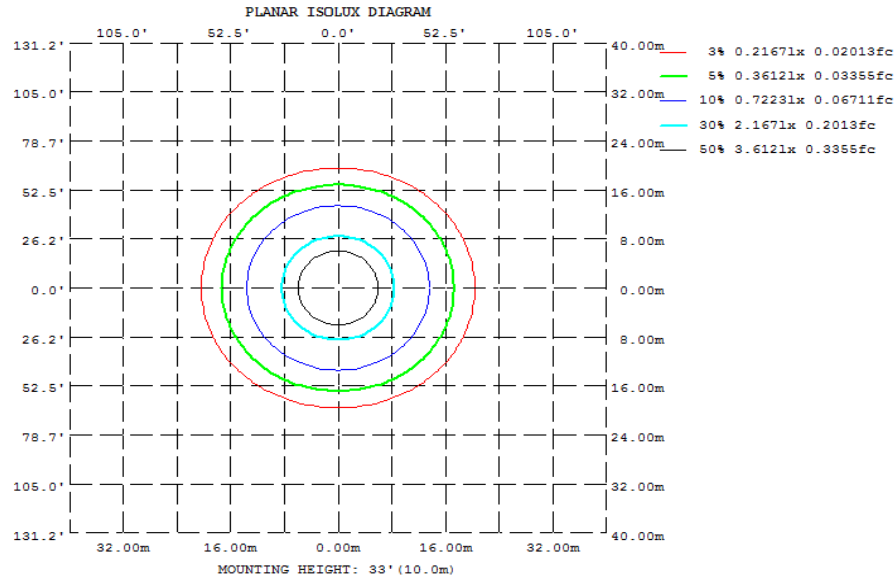
Zonal Lumen Requirement ( $0^{\circ}$ - $60^{\circ}$ )	UGR (X=4H, Y=8H, 70/50/20%)	Length(ft)	Lumen/ft
72.17%	22.4	2.00	1044

## 4.2 Goniophotometer Test

### Light Distribution Curve



### Isolux Plot





## 4.2 Goniophotometer Test

### Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	704.6	704.4	704.4	704.4	704.6	704.4	704.4	704.4
20	654.6	656.5	657.8	656.5	654.6	656.5	657.8	656.5
30	576.5	580.6	582.4	580.6	576.5	580.6	582.4	580.6
40	481.6	485.2	484.7	485.2	481.6	485.2	484.7	485.2
50	381.8	380.4	373.6	380.4	381.8	380.4	373.6	380.4
60	286.4	276.8	261.3	276.8	286.4	276.8	261.3	276.8
70	202.2	182.7	155.6	182.7	202.2	182.7	155.6	182.7
80	127.5	100.7	65.04	100.7	127.5	100.7	65.04	100.7
90	61.00	37.47	0.8417	37.47	61.00	37.47	0.8417	37.47
100	51.10	32.19	1.369	32.19	51.10	32.19	1.369	32.19
110	44.70	28.79	2.144	28.79	44.70	28.79	2.144	28.79
120	38.71	25.30	3.312	25.30	38.71	25.30	3.312	25.30
130	32.69	22.11	4.412	22.11	32.69	22.11	4.412	22.11
140	27.16	18.93	5.366	18.93	27.16	18.93	5.366	18.93
150	21.36	14.73	6.073	14.73	21.36	14.73	6.073	14.73
160	14.85	10.90	6.170	10.90	14.85	10.90	6.170	10.90
170	8.401	6.585	4.862	6.585	8.401	6.585	4.862	6.585
180	2.290	4.064	4.547	4.064	2.290	4.064	4.547	4.064
DEG	LUMINOUS INTENSITY:cd							

### UGR Table - Corrected

<b>UGR Table - Corrected</b>											
Reflectances											
Ceiling Cavity	70	70	50	50	30	70	70	50	50	30	
Walls	50	30	50	30	30	50	30	50	30	30	
Floor Cavity	20	20	20	20	20	20	20	20	20	20	
Room Size		UGR Viewed Crosswise					UGR Viewed Endwise				
X=2H	Y=2H	16.2	17.7	16.7	18.2	18.6	16.9	18.4	17.4	18.9	19.4
	3H	17.7	19.0	18.2	19.5	20.0	19.0	20.3	19.5	20.8	21.3
	4H	18.2	19.5	18.7	20.0	20.5	19.9	21.2	20.4	21.7	22.2
	6H	18.5	19.7	19.1	20.2	20.8	20.8	22.0	21.3	22.5	23.0
	8H	18.6	19.7	19.2	20.3	20.8	21.2	22.3	21.8	22.9	23.4
	12H	18.6	19.7	19.2	20.2	20.8	21.6	22.7	22.2	23.2	23.8
4H	2H	16.9	18.1	17.4	18.6	19.2	17.4	18.7	18.0	19.2	19.7
	3H	18.6	19.7	19.1	20.2	20.8	19.7	20.8	20.3	21.3	21.9
	4H	19.2	20.2	19.8	20.7	21.3	20.8	21.8	21.3	22.3	22.9
	6H	19.7	20.5	20.2	21.1	21.7	21.9	22.7	22.4	23.3	23.9
	8H	19.8	20.6	20.3	21.1	21.8	22.4	23.2	22.9	23.7	24.4
	12H	19.8	20.6	20.4	21.1	21.8	22.9	23.6	23.4	24.2	24.8
8H	4H	19.6	20.4	20.2	21.0	21.6	21.1	21.9	21.6	22.4	23.0
	6H	20.2	20.9	20.8	21.5	22.1	22.3	22.9	22.9	23.5	24.2
	8H	20.4	21.0	21.0	21.6	22.3	22.9	23.5	23.5	24.1	24.7
	12H	20.5	21.0	21.1	21.7	22.4	23.5	24.1	24.1	24.7	25.4
12H	4H	19.7	20.5	20.3	21.1	21.7	21.1	21.8	21.6	22.4	23.0
	6H	20.4	21.0	21.0	21.6	22.3	22.3	22.9	22.9	23.5	24.2
	8H	20.6	21.1	21.2	21.8	22.5	23.0	23.5	23.6	24.1	24.8
Maximum UGR = 25.4											

## 4.2 Goniophotometer Test

### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	68.03	0 - 10	68.03	3.26%
10-20	192.87	0 - 20	260.90	12.50%
20-30	286.00	0 - 30	546.90	26.20%
30-40	333.80	0 - 40	880.70	42.19%
40-50	333.46	0 - 50	1214.16	58.16%
50-60	292.35	0 - 60	1506.51	72.17%
60-70	224.64	0 - 70	1731.15	82.93%
70-80	146.03	0 - 80	1877.18	89.92%
80-90	68.99	0 - 90	1946.17	93.23%
90-100	34.06	0 - 100	1980.23	94.86%
100-110	29.41	0 - 110	2009.64	96.27%
110-120	24.61	0 - 120	2034.25	97.45%
120-130	19.63	0 - 130	2053.88	98.39%
130-140	14.71	0 - 140	2068.59	99.09%
140-150	10.07	0 - 150	2078.66	99.58%
150-160	5.83	0 - 160	2084.49	99.85%
160-170	2.53	0 - 170	2087.02	99.98%
170-180	0.51	0 - 180	2087.53	100.00%

## 4.2 Goniophotometer Test

### COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

#### Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0
R/W	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	117	117	117	117	114	114	114	114	107	107	107	101	101	101	96	96	96	93
1	107	102	97	93	103	99	95	91	93	90	87	88	85	83	83	81	79	77
2	97	89	82	76	94	86	80	74	81	76	72	77	73	69	73	70	66	64
3	88	78	70	63	85	76	68	62	72	65	60	68	63	58	65	60	56	54
4	81	69	60	54	78	67	59	53	64	57	51	61	55	50	58	53	49	46
5	75	62	53	46	72	60	52	46	57	50	44	55	48	43	52	47	42	40
6	69	56	47	40	67	54	46	40	52	44	39	50	43	38	47	42	37	35
7	64	50	42	36	62	49	41	35	47	40	35	45	39	34	43	38	33	31
8	59	46	38	32	58	45	37	32	43	36	31	41	35	30	40	34	30	28
9	56	42	34	29	54	41	34	28	40	33	28	38	32	27	37	31	27	25
10	52	39	31	26	51	38	31	26	37	30	25	35	29	25	34	29	25	23

### CONE OF LIGHT DIAGRAM



## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

Model No.	GUSJR2/15W/4000 K	Sample ID.	E1
Temperature (°C)	25.3	Humidity (%RH)	56.0

#### 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 25° C ± 1° 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

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
119.96	60	0.120	14.3	0.995	5.25%
277.03	60	0.056	14.7	0.943	9.16%

## 5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2022/12/26	2023/12/25
DLF108	Auxiliary Lamp	2022/12/26	2023/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2022/12/26	2023/12/25
DLF116	AC Power Source	2022/12/26	2023/12/25
DLF113	Power Meter	2022/12/26	2023/12/25
DLF112	Temperature Recorder	2022/12/26	2023/12/25
DLF114	Temperature & Humidity Datalogger	2022/12/26	2023/12/25
DLF101	Goniophotometer	2022/12/26	2023/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2022/12/26	2023/12/25
DLF104	AC Power Source	2022/12/26	2023/12/25
DLF507	DC Power Source	2022/12/26	2023/12/25
DLF102	Power Meter	2022/12/26	2023/12/25
DLF111	Temperature & Humidity Datalogger	2022/12/26	2023/12/25
DLF119	Power Meter	2022/12/26	2023/12/25
DLF031	Temperature data logger	2022/12/26	2023/12/25
DLF022	Digital power meter	2022/12/26	2023/12/25
DLF003	Temperature & Humidity Datalogger	2022/12/26	2023/12/25

\*\*\*\*\* End of Test Report\*\*\*\*\*