

# Photometric Test Report

## Relevant Standards

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

## Prepared For RAB Lighting Inc.

Room 6A33, No.1388, Wuzhong road, Shanghai, China

Xiao Xiang, 15921313292, Gary.Xiao@rabweb.com

## Prepared By

Deliver Co., Ltd.

Block 11, 78 Keling Road, SSTP, Suzhou, China

0512-66801950, kevin.jia@szdeliver.com

## Project Number

**DLF2212110**

## Report Number

**DLF2212110-3a**

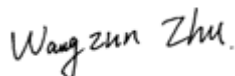
## Test Date

**2023/1/3**

## Issue Date

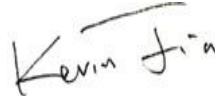
**2023/1/5**

### 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		1410
Lumen/ft (Goniophotometer - Section 4.2)	IES LM-79-2008	≥375		705
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 115	Premium 130	131.8
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		10.7
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	8.32%
		20.00%	277V	17.23%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.990
		0.9	277V	0.889
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	5029±355	4951
		4 step	5029±220	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥80		84
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥0		11
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%		-12%
Zonal Lumen Requirement (0°-60°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≥40%		72.08%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22		21.0
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		0.044
(Goniophotometer - Section 4.2)		Non-Wroست Case		0.083
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		10.7
(Goniophotometer - Section 4.2)		Non-Wroست Case		9.8

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023/1/3	GUSJR2/10W/5000K	C1
2	Goniophotometer Test	2023/1/3	GUSJR2/10W/5000K	C1
3	THD and PF Test	2023/1/3	GUSJR2/10W/5000K	C1

### 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.

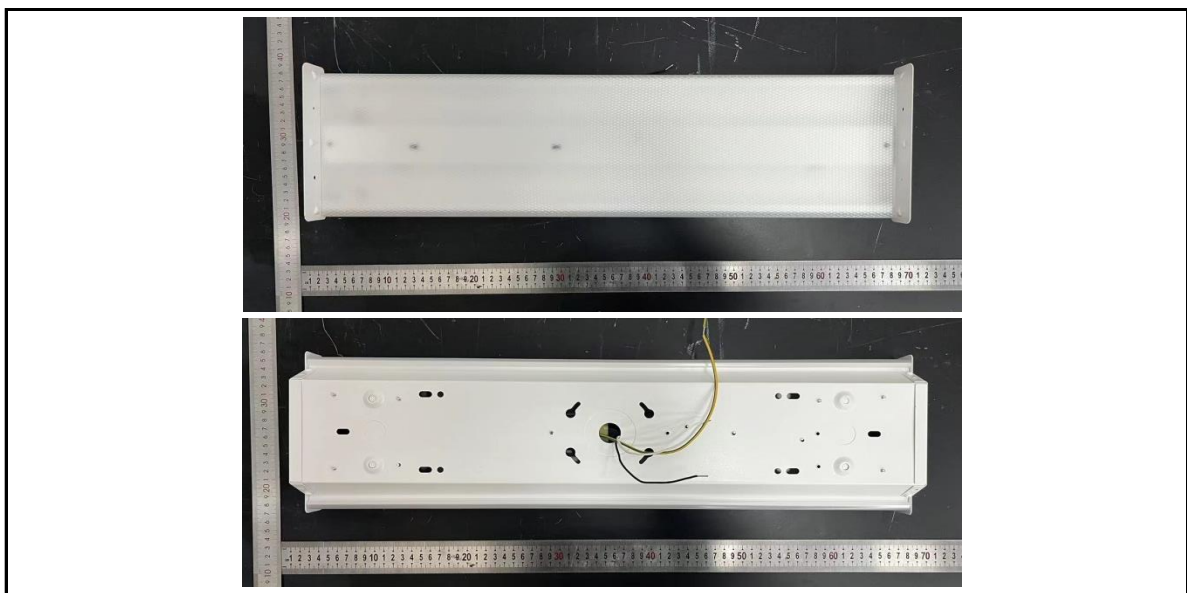
2、 The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing 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:** GUSJR2/10W/5000K

**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.	GUSJR2/10W/5000K	Sample ID.	C1
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
120.01	60	0.083	9.9	0.990
277.03	60	0.044	10.8	0.889

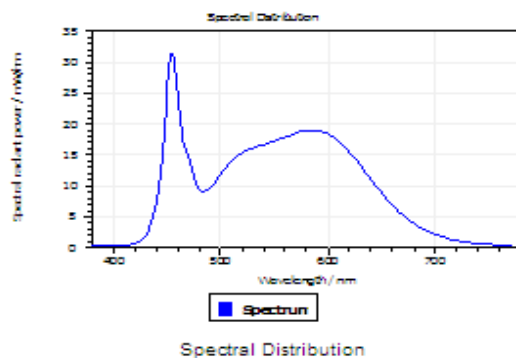
#### Test Result

CCT (K)	CRI	R9	Duv
4951	84	11	0.0041

Rf	Rg	IES Rcs,h1
84	93	-12%

## 4.1 Integrating Sphere Test

### Results

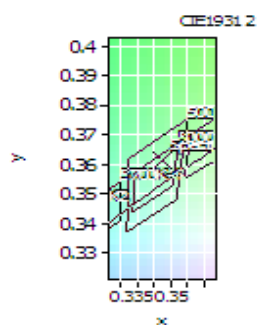


### Spectral values

DominantWavelength 589.89 nm  
Purity 0.128  
PeakWavelength 454.59 nm  
Radiant Power 3.709 W  
Width50%:

### Color Coordinates

Correlated Color Temperat 4951 K  
x: 0.3474 u: 0.2091 u': 0.2091  
y: 0.3618 v: 0.3266 v': 0.4899  
CRI01 82.8 CRI09 11.1  
CRI02 91.4 CRI10 78.9  
CRI03 95.6 CRI11 81.6  
CRI04 82.1 CRI12 60.9  
CRI05 82.9 CRI13 85.5  
CRI06 87.1 CRI14 98.1  
CRI07 86.5 CRI15 76.9  
CRI08 67.0 CRI16 73.0  
ResultsCRI 84.4



PlanckDistance 4.1E-003

## 4.1 Integrating Sphere Test

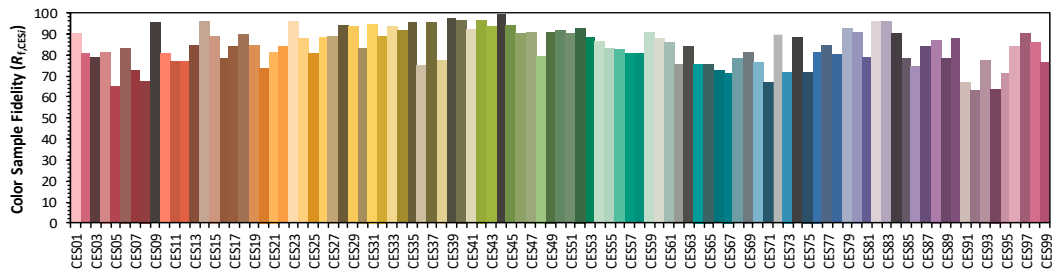
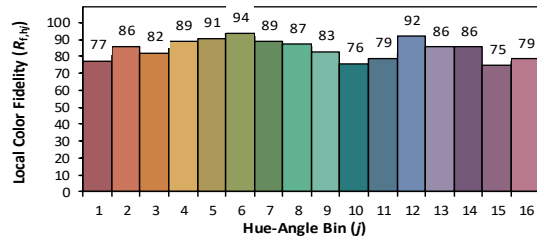
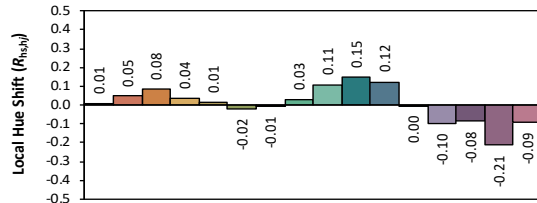
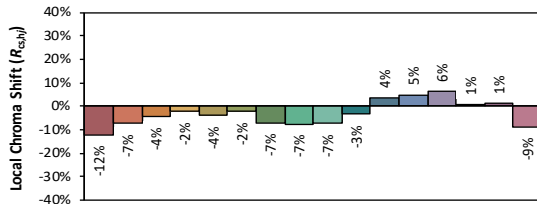
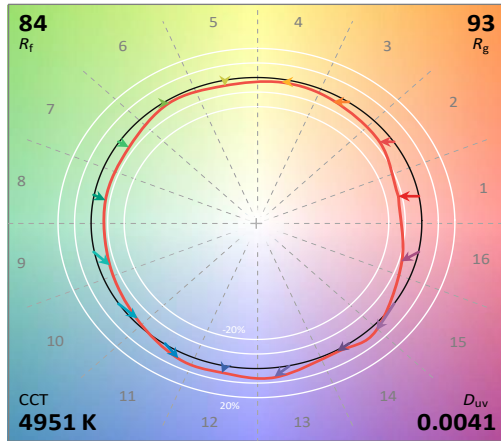
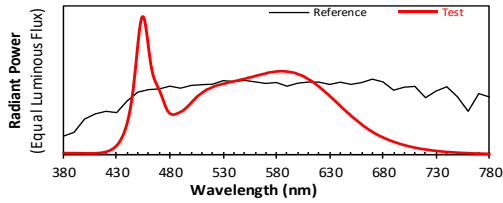
### IES TM-30-18 Color Rendition Report

Source: DLF2212110-3a

Manufacturer: RAB Lighting Inc.

Date: 2023/1/3

Model: GUSJR2/10W/5000K



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

$x$  0.3474  
 $y$  0.3618  
 $u'$  0.2091  
 $v'$  0.4899

CIE 13.3-1995  
(CRI)

$R_a$  85  
 $R_9$  16

## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

Model No.	GUSJR2/10W/5000K	Sample ID.	C1
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	276.99	60	0.044	10.7	0.880
NON-WROST CASE	119.99	60	0.083	9.8	0.981

#### Test Result

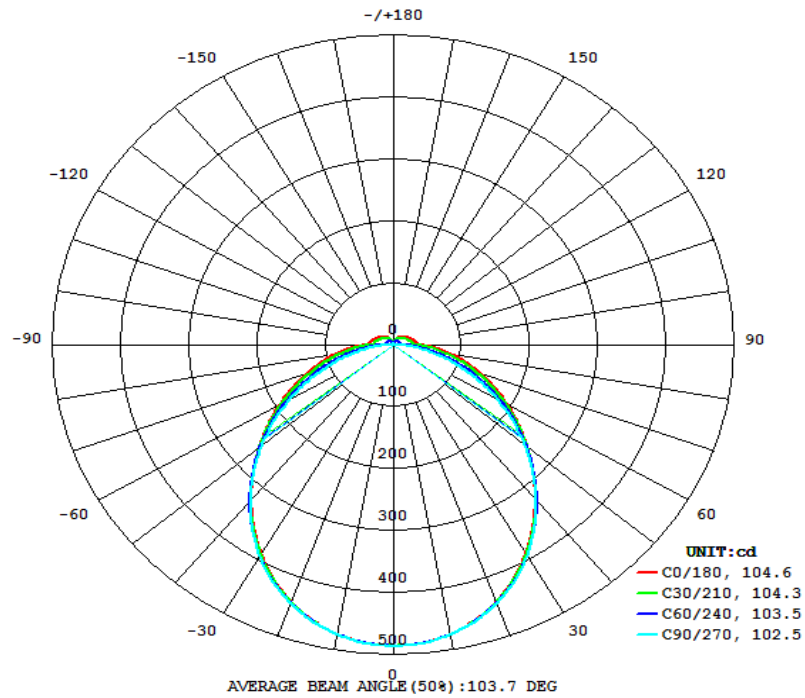
Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
1410	175.7	158.1	104.6	102.5	131.8

Zonal Lumen Requirement ( $0^{\circ}$ - $60^{\circ}$ )	UGR (X=4H, Y=8H, 70/50/20%)	Length(ft)	Lumen/ft
72.08%	21.0	2.00	705

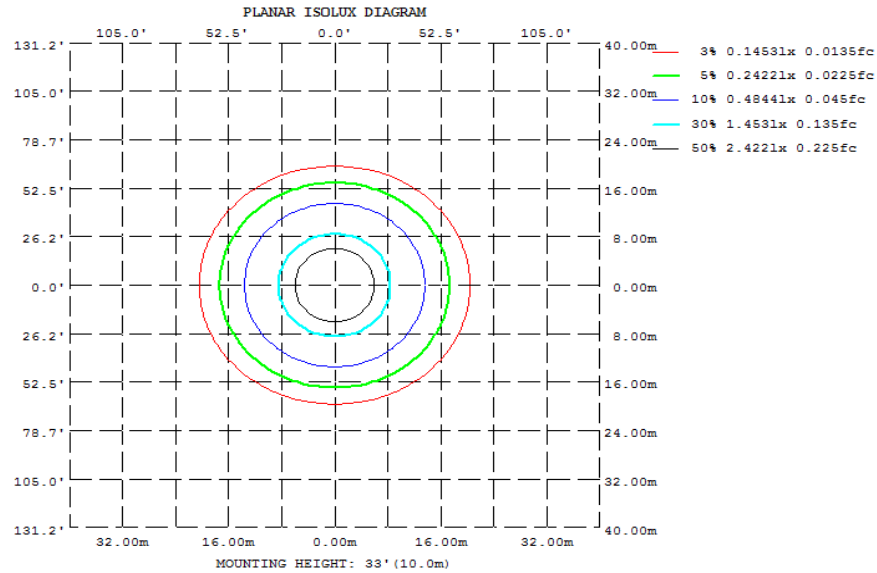


## 4.2 Goniophotometer Test

### Light Distribution Curve



### Isolux Plot





## 4.2 Goniophotometer Test

### Zonal Lumen Summary

$\gamma$	C0	C45	C90	C135	C180	C225	C270	C315
10	474.3	474.6	474.7	474.6	474.3	474.6	474.7	474.6
20	441.0	442.6	443.6	442.6	441.0	442.6	443.6	442.6
30	388.5	391.8	393.0	391.8	388.5	391.8	393.0	391.8
40	324.9	327.7	327.1	327.7	324.9	327.7	327.1	327.7
50	257.9	257.0	252.5	257.0	257.9	257.0	252.5	257.0
60	193.9	187.3	176.6	187.3	193.9	187.3	176.6	187.3
70	136.8	123.5	105.1	123.5	136.8	123.5	105.1	123.5
80	86.36	68.31	44.24	68.31	86.36	68.31	44.24	68.31
90	40.85	25.47	0.2079	25.47	40.85	25.47	0.2079	25.47
100	34.77	21.91	0.9136	21.91	34.77	21.91	0.9136	21.91
110	30.38	19.58	1.509	19.58	30.38	19.58	1.509	19.58
120	26.28	17.20	2.280	17.20	26.28	17.20	2.280	17.20
130	22.18	15.03	3.031	15.03	22.18	15.03	3.031	15.03
140	18.43	12.87	3.671	12.87	18.43	12.87	3.671	12.87
150	14.47	10.07	4.125	10.07	14.47	10.07	4.125	10.07
160	10.10	7.394	4.231	7.394	10.10	7.394	4.231	7.394
170	5.686	4.553	3.346	4.553	5.686	4.553	3.346	4.553
180	1.654	2.838	3.095	2.838	1.654	2.838	3.095	2.838
DEG	LUMINOUS INTENSITY:cd							

### UGR Table - Corrected

UGR Table - Corrected										
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	14.8	16.3	15.3	16.8	17.2	15.5	17.0	16.0	17.5	18.0
3H	16.3	17.6	16.8	18.1	18.6	17.6	18.9	18.1	19.4	19.9
4H	16.8	18.1	17.3	18.6	19.1	18.5	19.8	19.0	20.3	20.8
6H	17.1	18.3	17.7	18.8	19.4	19.4	20.6	19.9	21.1	21.7
8H	17.2	18.3	17.7	18.9	19.4	19.8	21.0	20.4	21.5	22.0
12H	17.3	18.3	17.8	18.8	19.4	20.2	21.3	20.8	21.8	22.4
4H	2H	15.5	16.7	16.0	17.2	17.8	16.1	17.3	16.6	17.8
3H	17.2	18.3	17.7	18.8	19.4	18.4	19.4	18.9	19.9	20.5
4H	17.8	18.8	18.4	19.3	19.9	19.4	20.4	20.0	20.9	21.5
6H	18.3	19.1	18.8	19.7	20.3	20.5	21.3	21.0	21.9	22.5
8H	18.4	19.2	18.9	19.7	20.4	21.0	21.8	21.5	22.3	23.0
12H	18.4	19.2	19.0	19.8	20.4	21.5	22.2	22.1	22.8	23.4
8H	4H	18.3	19.1	18.8	19.6	20.2	19.7	20.5	20.2	21.0
6H	18.8	19.5	19.4	20.1	20.7	20.9	21.6	21.5	22.2	22.8
8H	19.0	19.6	19.6	20.2	20.9	21.5	22.1	22.1	22.7	23.4
12H	19.1	19.7	19.7	20.3	21.0	22.1	22.7	22.7	23.3	24.0
12H	4H	18.3	19.1	18.9	19.7	20.3	19.7	20.4	20.3	21.0
6H	19.0	19.6	19.6	20.2	20.9	20.9	21.5	21.6	22.1	22.8
8H	19.2	19.8	19.8	20.4	21.1	21.6	22.1	22.2	22.7	23.4
Maximum UGR = 24.0										

## 4.2 Goniophotometer Test

### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	45.82	0 - 10	45.82	3.25%
10-20	129.95	0 - 20	175.77	12.46%
20-30	192.84	0 - 30	368.61	26.14%
30-40	225.22	0 - 40	593.83	42.11%
40-50	225.16	0 - 50	818.99	58.07%
50-60	197.55	0 - 60	1016.54	72.08%
60-70	151.94	0 - 70	1168.48	82.86%
70-80	98.83	0 - 80	1267.31	89.86%
80-90	46.77	0 - 90	1314.08	93.18%
90-100	23.19	0 - 100	1337.27	94.83%
100-110	20.02	0 - 110	1357.29	96.25%
110-120	16.74	0 - 120	1374.03	97.43%
120-130	13.34	0 - 130	1387.37	98.38%
130-140	9.99	0 - 140	1397.36	99.09%
140-150	6.84	0 - 150	1404.20	99.57%
150-160	3.96	0 - 160	1408.16	99.85%
160-170	1.72	0 - 170	1409.88	99.97%
170-180	0.36	0 - 180	1410.24	100.00%

## 4.2 Goniophotometer Test

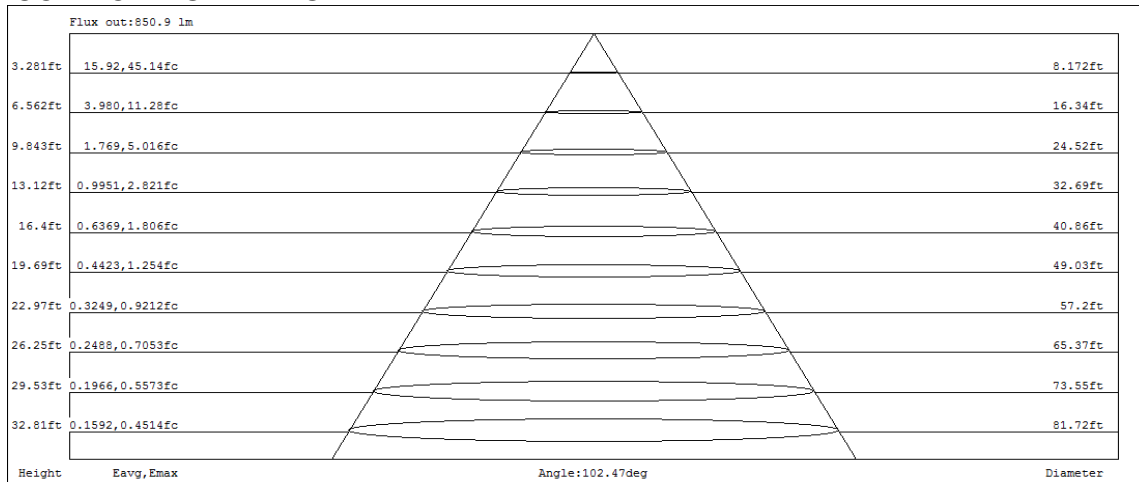
### COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

#### Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0
RW	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	53	78	67	59	53	64	57	51	61	55	50	58	53	48	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	66	54	46	40	52	44	39	49	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.	GUSJR2/10W/5000 K	Sample ID.	C1
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
120.01	60	0.083	9.9	0.990	8.32%
277.03	60	0.044	10.8	0.889	17.23%

## 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\*\*\*\*\*