

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

DLF2212110-11a

Test Date

2023/1/3

Issue Date

2023/1/5

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

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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	1500		3061
Lumen/ft (Goniophotometer - Section 4.2)	IES LM-79-2008	≥375		765
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 115	Premium 130	150.1
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		20.4
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	6.01%
		20.00%	277V	12.37%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.989
		0.9	277V	0.892
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3985±275	4163
		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		16
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%		71.79%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22		21.3
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		277
(Goniophotometer - Section 4.2)		Non-Wrost Case		120
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		0.083
(Goniophotometer - Section 4.2)		Non-Wrost Case		0.160
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		20.4
(Goniophotometer - Section 4.2)		Non-Wrost Case		18.9

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023/1/3	GUSJR4/20W/4000K	K1
2	Goniophotometer Test	2023/1/3	GUSJR4/20W/4000K	K1
3	THD and PF Test	2023/1/3	GUSJR4/20W/4000K	K1

Remark(If any)

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- 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: GUSJR4/20W/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.	GUSJR4/20W/4000K	Sample ID.	K1
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 ± 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 Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.02	60	0.159	18.9	0.989
277.02	60	0.083	20.4	0.892

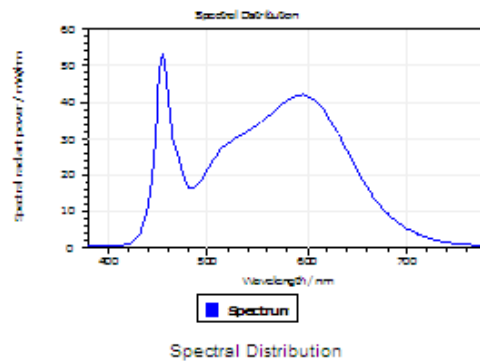
Test Result

CCT (K)	CRI	R9	Duv
4163	85	16	0.0015

Rf	Rg	IES Rcs,h1
84	93	-12%

4.1 Integrating Sphere Test

Results



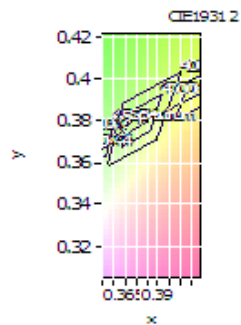
Spectral values

DominantWavelength 577.59 nm
Purity 0.252
PeakWavelength 454.86 nm
Radiant Power 7.516 W
Width50%:

Color Coordinates

Correlated Color Temperatur 4163 K
x: 0.3744 u: 0.2214 u': 0.2214
y: 0.3760 v: 0.3336 v': 0.5003

CRI01	83.9	CRI09	16.0
CRI02	92.7	CRI10	81.5
CRI03	96.5	CRI11	81.2
CRI04	81.7	CRI12	60.1
CRI05	83.1	CRI13	86.6
CRI06	88.4	CRI14	98.7
CRI07	86.1	CRI15	77.8
CRI08	66.8	CRI16	73.2
ResultsCRI	84.9		



PlanckDistance 1.5E-003

4.1 Integrating Sphere Test

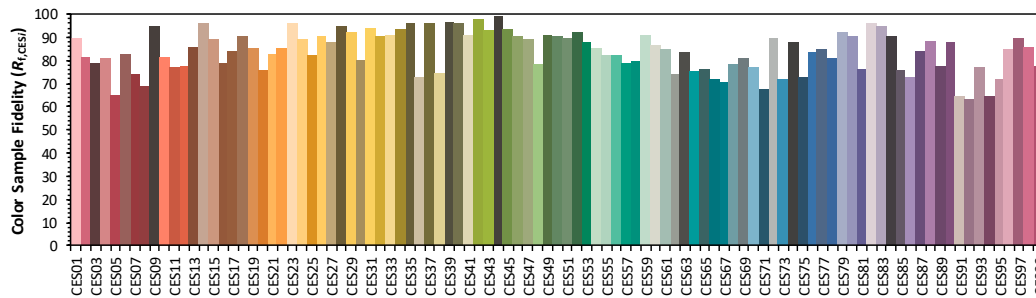
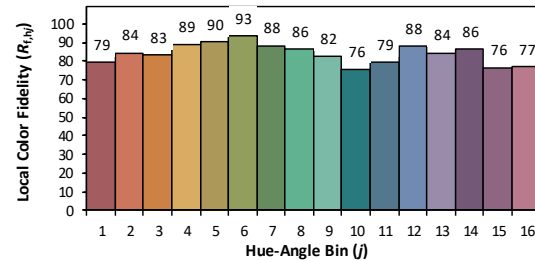
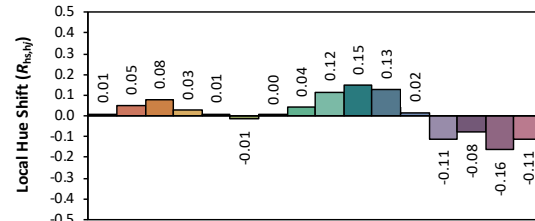
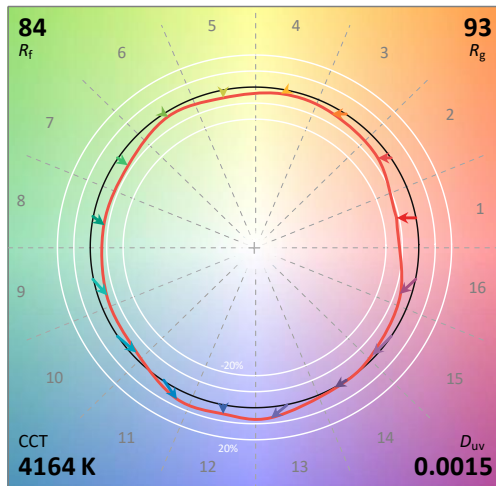
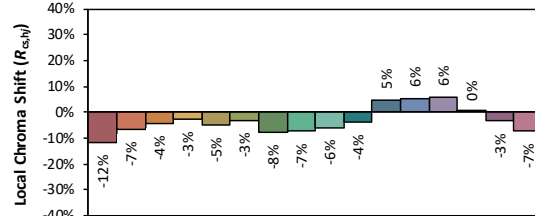
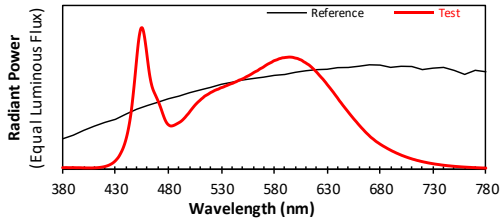
IES TM-30-18 Color Rendition Report

Source: DLF2212110-11a

Manufacturer: RAB Lighting Inc.

Date: 2023/1/3

Model: GUSJR4/20W/4000K



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

x 0.3744
 y 0.3760
 u' 0.2214
 v' 0.5003

CIE 13.3-1995
(CRI)

R_a 85
 R_g 19

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	GUSJR4/20W/4000K	Sample ID.	K1
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° C ± 1° 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 ±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° vertical intervals and 10° horizontal intervals.

Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WROST CASE	277.00	60	0.083	20.4	0.885
NON-WROST CASE	120.00	60	0.160	18.9	0.982

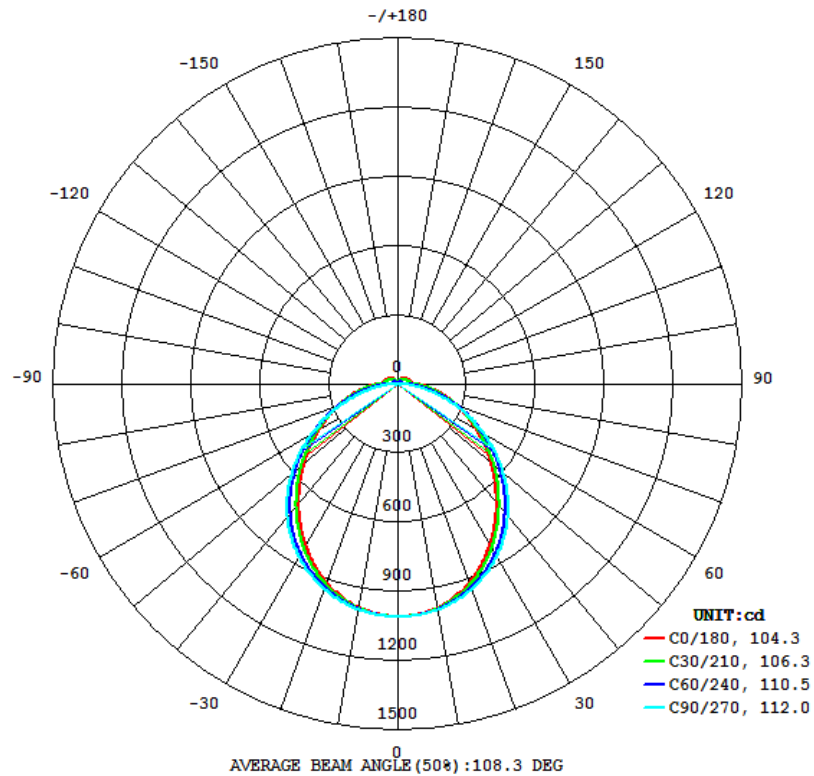
Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
3061	174.8	161.1	104.3	112.0	150.1

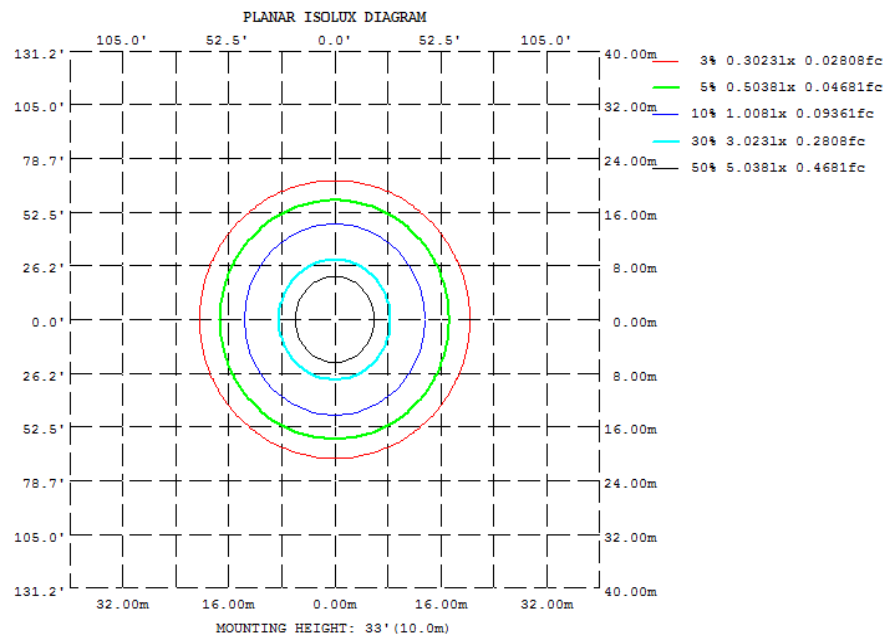
Zonal Lumen Requirement (0°-60°)	UGR (X=4H, Y=8H, 70/50/20%)	Length(ft)	Lumen/ft
71.79%	21.3	4.00	765

4.2 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	985.5	989.7	994.0	989.7	985.5	989.7	994.0	989.7
20	915.6	931.0	945.1	931.0	915.6	931.0	945.1	931.0
30	805.6	835.0	864.2	835.0	805.6	835.0	864.2	835.0
40	673.0	709.7	749.0	709.7	673.0	709.7	749.0	709.7
50	534.7	567.2	603.6	567.2	534.7	567.2	603.6	567.2
60	399.9	418.9	437.3	418.9	399.9	418.9	437.3	418.9
70	278.8	277.8	266.2	277.8	278.8	277.8	266.2	277.8
80	173.0	152.9	108.5	152.9	173.0	152.9	108.5	152.9
90	81.41	57.28	1.493	57.28	81.41	57.28	1.493	57.28
100	69.33	48.26	1.714	48.26	69.33	48.26	1.714	48.26
110	60.14	42.32	2.920	42.32	60.14	42.32	2.920	42.32
120	51.78	36.46	4.383	36.46	51.78	36.46	4.383	36.46
130	43.62	31.39	5.629	31.39	43.62	31.39	5.629	31.39
140	36.41	26.00	6.641	26.00	36.41	26.00	6.641	26.00
150	28.25	19.96	6.906	19.96	28.25	19.96	6.906	19.96
160	19.54	13.75	6.580	13.75	19.54	13.75	6.580	13.75
170	11.27	8.485	6.052	8.485	11.27	8.485	6.052	8.485
180	5.780	6.606	6.823	6.606	5.780	6.606	6.823	6.606
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	16.0	17.5	16.5	17.9	18.4	15.8	17.3	16.3	17.8	18.3
	3H	17.6	18.9	18.0	19.4	19.9	17.9	19.2	18.3	19.7	20.2
	4H	18.1	19.4	18.6	19.9	20.4	18.8	20.0	19.3	20.5	21.1
	6H	18.4	19.6	19.0	20.1	20.7	19.7	20.8	20.2	21.3	21.9
	8H	18.5	19.6	19.0	20.2	20.7	20.1	21.2	20.6	21.7	22.3
	12H	18.6	19.6	19.1	20.1	20.7	20.5	21.6	21.0	22.1	22.7
4H	2H	16.6	17.8	17.1	18.3	18.8	16.4	17.7	16.9	18.2	18.7
	3H	18.4	19.4	18.9	20.0	20.5	18.7	19.7	19.2	20.3	20.8
	4H	19.0	20.0	19.6	20.5	21.1	19.7	20.7	20.3	21.2	21.8
	6H	19.5	20.3	20.1	20.9	21.5	20.8	21.6	21.3	22.2	22.8
	8H	19.6	20.4	20.2	21.0	21.6	21.3	22.1	21.8	22.6	23.2
	12H	19.7	20.4	20.3	21.0	21.6	21.8	22.5	22.4	23.1	23.7
8H	4H	19.4	20.2	20.0	20.8	21.4	20.0	20.8	20.6	21.4	22.0
	6H	20.0	20.7	20.6	21.3	21.9	21.2	21.9	21.8	22.5	23.1
	8H	20.2	20.8	20.8	21.4	22.1	21.8	22.4	22.4	23.0	23.7
	12H	20.3	20.8	20.9	21.4	22.2	22.5	23.0	23.1	23.6	24.3
12H	4H	19.5	20.2	20.1	20.8	21.4	20.0	20.8	20.6	21.3	22.0
	6H	20.1	20.7	20.8	21.3	22.0	21.3	21.9	21.9	22.5	23.1
	8H	20.4	20.9	21.0	21.5	22.2	21.9	22.5	22.5	23.1	23.8
Maximum UGR = 24.3											

4.2 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	95.42	0 - 10	95.42	3.12%
10-20	272.20	0 - 20	367.62	12.01%
20-30	408.55	0 - 30	776.17	25.36%
30-40	485.12	0 - 40	1261.29	41.20%
40-50	494.48	0 - 50	1755.77	57.36%
50-60	441.87	0 - 60	2197.64	71.79%
60-70	342.72	0 - 70	2540.36	82.99%
70-80	220.83	0 - 80	2761.19	90.20%
80-90	101.35	0 - 90	2862.54	93.51%
90-100	49.39	0 - 100	2911.93	95.13%
100-110	42.09	0 - 110	2954.02	96.50%
110-120	34.74	0 - 120	2988.76	97.64%
120-130	27.29	0 - 130	3016.05	98.53%
130-140	20.12	0 - 140	3036.17	99.19%
140-150	13.47	0 - 150	3049.64	99.63%
150-160	7.55	0 - 160	3057.19	99.87%
160-170	3.15	0 - 170	3060.34	99.98%
170-180	0.71	0 - 180	3061.05	100.00%

4.2 Goniophotometer Test

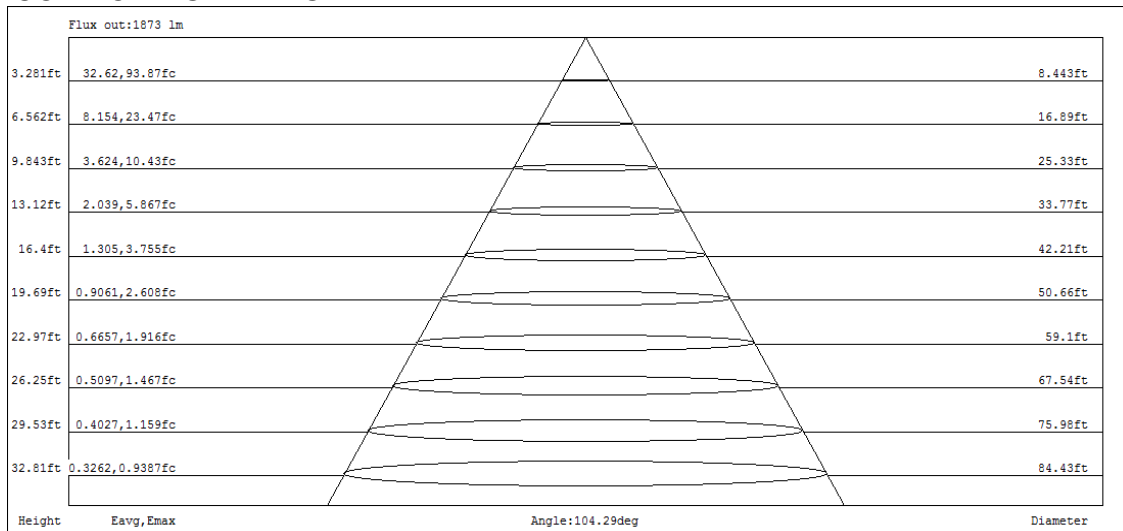
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	118	118	118	118	114	114	114	114	108	108	108	102	102	102	96	96	96	94
1	107	102	97	93	103	99	95	91	93	90	87	88	85	83	84	81	79	77
2	97	88	81	75	94	86	79	74	81	76	71	77	73	69	73	69	66	64
3	88	77	69	63	85	75	68	62	71	65	60	68	62	58	64	60	56	54
4	81	69	60	53	78	67	59	52	63	56	51	60	54	49	57	52	48	46
5	74	61	52	46	72	60	51	45	57	50	44	54	48	43	52	46	42	39
6	68	55	46	40	66	54	45	39	51	44	38	49	43	38	47	41	37	35
7	64	50	41	35	61	49	41	35	47	39	34	45	38	33	43	37	33	31
8	59	46	37	31	57	45	37	31	43	36	30	41	35	30	39	34	29	27
9	55	42	34	28	53	41	33	28	39	32	27	38	31	27	36	31	26	25
10	52	39	31	25	50	38	30	25	36	30	25	35	29	24	34	28	24	22

CONE OF LIGHT DIAGRAM



4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	GUSJR4/20W/4000 K	Sample ID.	K1
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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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
120.02	60	0.159	18.9	0.989	6.01%
277.02	60	0.083	20.4	0.892	12.37%

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*****