

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

DLF2212110-13a

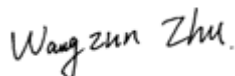
Test Date

2023/1/3

Issue Date

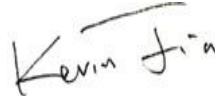
2023/1/5

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		4002
Lumen/ft (Goniophotometer - Section 4.2)	IES LM-79-2008	≥375		1001
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 115	Premium 130	133.8
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		29.9
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	6.45%
		20.00%	277V	7.53%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.994
		0.9	277V	0.927
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3465±245	3451
		4 step	3465±124	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥80		83
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥0		9
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		85
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		95
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%		71.76%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22		22.2
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		0.117
(Goniophotometer - Section 4.2)		Non-Wroست Case		0.242
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		29.9
(Goniophotometer - Section 4.2)		Non-Wroست Case		28.7

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023/1/3	GUSJR4/30W/3500K	M1
2	Goniophotometer Test	2023/1/3	GUSJR4/30W/3500K	M1
3	THD and PF Test	2023/1/3	GUSJR4/30W/3500K	M1

Remark(If any)

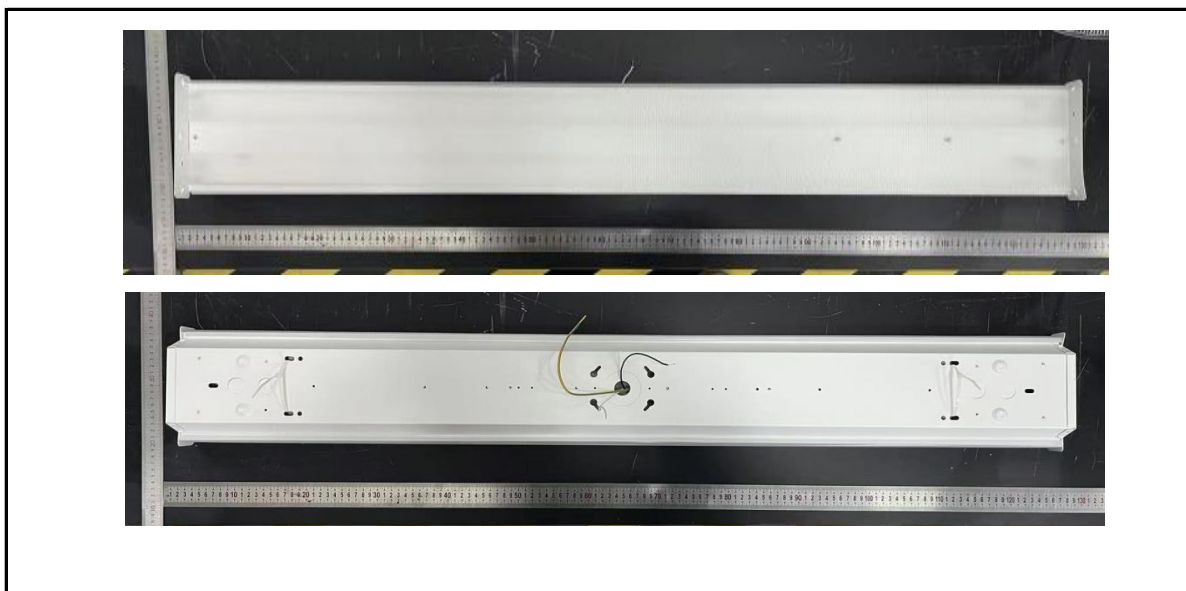
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3.0 Production Description

Luminaire Description: GUSJR4/30W/3500K

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.	GUSJR4/30W/3500K	Sample ID.	M1
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
119.99	60	0.241	28.7	0.994
276.99	60	0.116	29.9	0.927

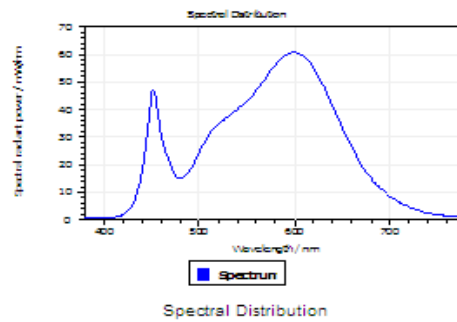
Test Result

CCT (K)	CRI	R9	Duv
3451	83	9	0.0014

Rf	Rg	IES Rcs,h1
85	95	-12%

4.1 Integrating Sphere Test

Results

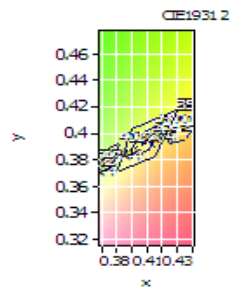


Spectral values

DominantWavelength 580.51 nm
Purity 0.418
PeakWavelength 599.12 nm
Radiant Power 9.81 W
Width50%:

Color Coordinates

Correlated Color Temperat 3451 K
x: 0.4095 u: 0.2363 u': 0.2363
y: 0.3959 v: 0.3427 v': 0.5140
CRI01 81.4 CRI09 8.5
CRI02 90.3 CRI10 77.5
CRI03 96.7 CRI11 81.0
CRI04 81.8 CRI12 66.0
CRI05 81.7 CRI13 83.6
CRI06 87.6 CRI14 98.5
CRI07 84.8 CRI15 74.2
CRI08 62.1 CRI16 71.7
ResultsCRI 83.3



PlanckDistance 1.4E-003

4.1 Integrating Sphere Test

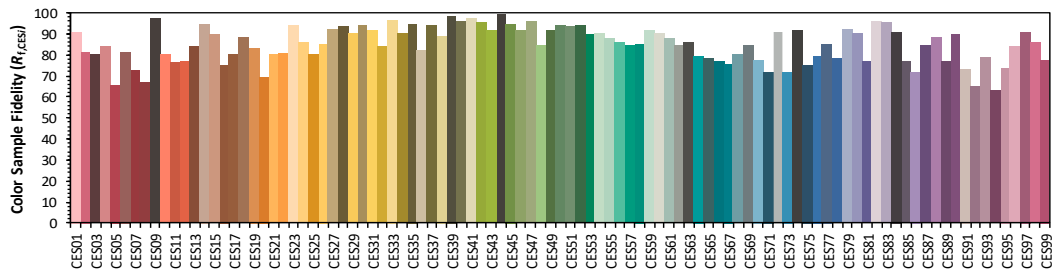
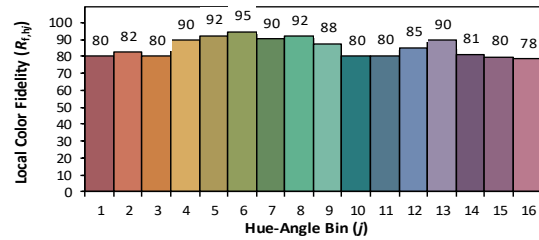
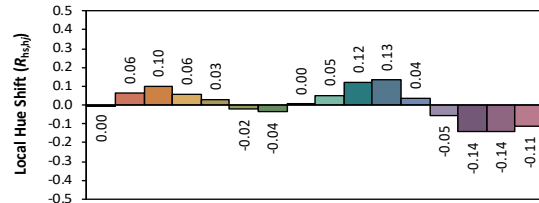
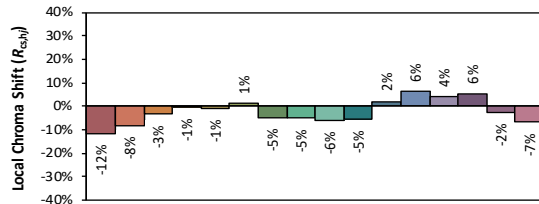
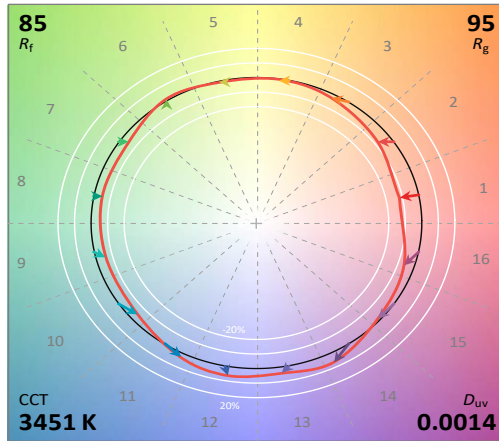
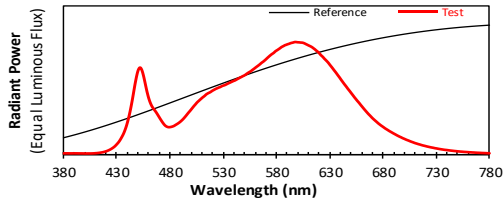
IES TM-30-18 Color Rendition Report

Source: DLF2212110-13a

Manufacturer: RAB Lighting Inc.

Date: 2023/1/3

Model: GUSJR4/30W/3500K



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

x 0.4095
 y 0.3959
 u' 0.2363
 v' 0.5140

CIE 13.3-1995
(CRI)

R_a 84
 R_9 13

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	GUSJR4/30W/3500K	Sample ID.	M1
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 ± 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	276.99	60	0.117	29.9	0.923
NON-WROST CASE	120.00	60	0.242	28.7	0.990

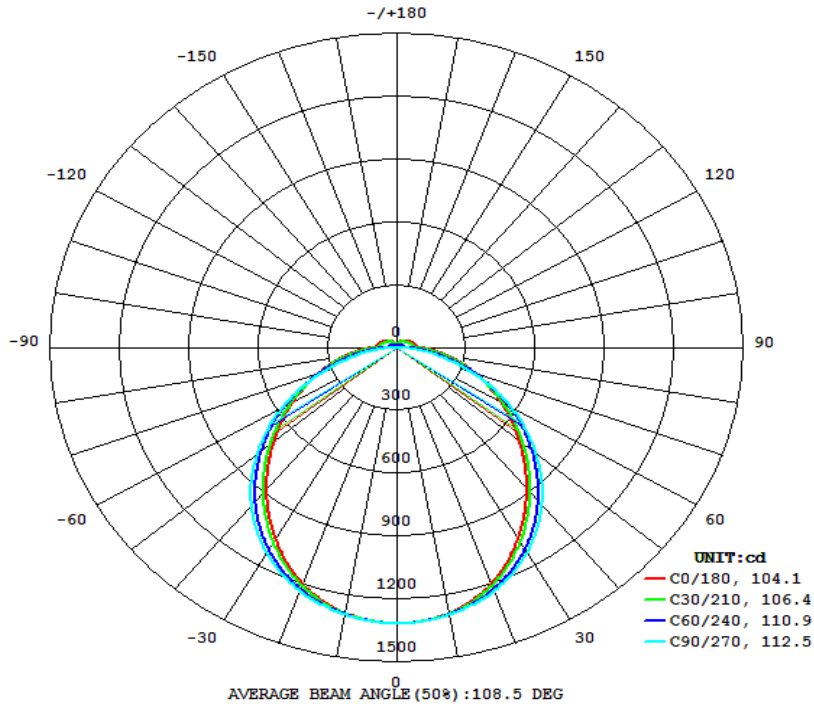
Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
4002	174.8	161.3	104.1	112.5	133.8

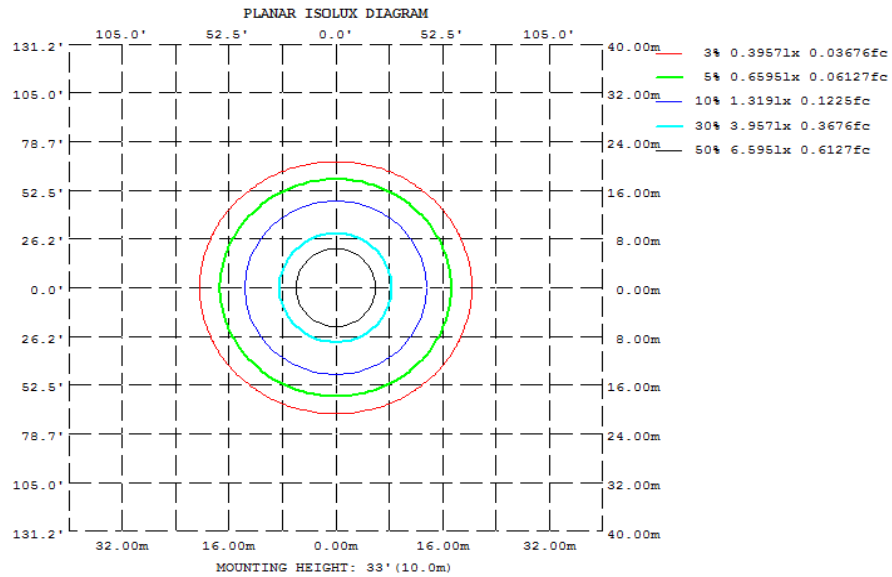
Zonal Lumen Requirement (0° - 60°)	UGR (X=4H, Y=8H, 70/50/20%)	Length(ft)	Lumen/ft
71.76%	22.2	4.00	1001

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	1289	1290	1295	1290	1289	1290	1295	1290
20	1199	1216	1235	1216	1199	1216	1235	1216
30	1053	1090	1130	1090	1053	1090	1130	1090
40	879.4	926.5	980.4	926.5	879.4	926.5	980.4	926.5
50	697.5	740.3	790.6	740.3	697.5	740.3	790.6	740.3
60	523.3	548.7	574.9	548.7	523.3	548.7	574.9	548.7
70	363.8	363.6	350.3	363.6	363.8	363.6	350.3	363.6
80	225.7	199.9	143.6	199.9	225.7	199.9	143.6	199.9
90	106.3	73.55	1.993	73.55	106.3	73.55	1.993	73.55
100	90.39	63.16	2.141	63.16	90.39	63.16	2.141	63.16
110	78.48	55.39	3.809	55.39	78.48	55.39	3.809	55.39
120	67.56	47.73	5.748	47.73	67.56	47.73	5.748	47.73
130	56.97	41.10	7.391	41.10	56.97	41.10	7.391	41.10
140	47.57	34.00	8.671	34.00	47.57	34.00	8.671	34.00
150	36.94	26.10	9.035	26.10	36.94	26.10	9.035	26.10
160	25.43	17.92	8.688	17.92	25.43	17.92	8.688	17.92
170	14.67	11.22	7.964	11.22	14.67	11.22	7.964	11.22
180	7.117	8.635	8.944	8.635	7.117	8.635	8.944	8.635
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										
X=2H Y=2H	UGR Viewed Crosswise					UGR Viewed Endwise				
3H	16.9	18.4	17.4	18.8	19.3	16.7	18.2	17.2	18.7	19.2
4H	18.5	19.8	19.0	20.3	20.8	18.7	20.1	19.2	20.6	21.1
6H	19.0	20.3	19.5	20.8	21.3	19.7	20.9	20.2	21.4	22.0
8H	19.4	20.5	19.9	21.0	21.6	20.5	21.7	21.1	22.2	22.8
12H	19.4	20.6	20.0	21.1	21.7	21.0	22.1	21.5	22.6	23.2
	19.5	20.6	20.0	21.1	21.7	21.4	22.4	21.9	23.0	23.6
4H 2H	17.5	18.7	18.0	19.2	19.8	17.3	18.6	17.8	19.1	19.6
4H 3H	19.3	20.4	19.8	20.9	21.5	19.6	20.6	20.1	21.2	21.7
4H 4H	20.0	20.9	20.5	21.5	22.1	20.6	21.6	21.2	22.1	22.7
4H 6H	20.4	21.3	21.0	21.8	22.5	21.7	22.5	22.2	23.1	23.7
4H 8H	20.5	21.3	21.1	21.9	22.5	22.2	23.0	22.7	23.5	24.1
4H 12H	20.6	21.3	21.2	21.9	22.6	22.7	23.4	23.2	24.0	24.6
8H 4H	20.3	21.1	20.9	21.7	22.3	20.9	21.7	21.5	22.3	22.9
8H 6H	20.9	21.6	21.5	22.2	22.8	22.1	22.8	22.7	23.4	24.0
8H 8H	21.1	21.7	21.7	22.3	23.0	22.7	23.3	23.3	23.9	24.6
8H 12H	21.2	21.8	21.8	22.4	23.1	23.4	23.9	24.0	24.5	25.2
12H 4H	20.4	21.1	21.0	21.7	22.3	20.9	21.7	21.5	22.2	22.9
12H 6H	21.1	21.7	21.7	22.2	22.9	22.2	22.8	22.8	23.4	24.0
12H 8H	21.3	21.8	21.9	22.4	23.2	22.8	23.4	23.4	24.0	24.7
Maximum UGR = 25.2										

4.2 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	124.39	0 - 10	124.39	3.11%
10-20	355.56	0 - 20	479.95	11.99%
20-30	533.88	0 - 30	1013.83	25.33%
30-40	633.78	0 - 40	1647.61	41.17%
40-50	645.96	0 - 50	2293.57	57.31%
50-60	578.19	0 - 60	2871.76	71.76%
60-70	448.99	0 - 70	3320.75	82.98%
70-80	289.19	0 - 80	3609.94	90.20%
80-90	132.60	0 - 90	3742.54	93.52%
90-100	64.55	0 - 100	3807.09	95.13%
100-110	55.01	0 - 110	3862.10	96.50%
110-120	45.40	0 - 120	3907.50	97.64%
120-130	35.67	0 - 130	3943.17	98.53%
130-140	26.31	0 - 140	3969.48	99.19%
140-150	17.62	0 - 150	3987.10	99.63%
150-160	9.88	0 - 160	3996.98	99.87%
160-170	4.13	0 - 170	4001.11	99.98%
170-180	0.93	0 - 180	4002.04	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	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	93	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	53
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	63	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.	GUSJR4/30W/3500 K	Sample ID.	M1
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
119.99	60	0.241	28.7	0.994	6.45%
276.99	60	0.116	29.9	0.927	7.53%

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*****