

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

DLF2212110-17a

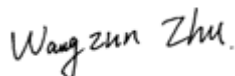
Test Date

2023/1/3

Issue Date

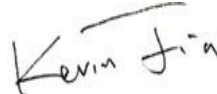
2023/1/5

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		5540
Lumen/ft (Goniophotometer - Section 4.2)	IES LM-79-2008	≥375		1385
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 115	Premium 130	146.6
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		37.8
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	8.36%
		20.00%	277V	6.62%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.994
		0.9	277V	0.962
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3985±275	4150
		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		15
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%		71.70%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22		23.4
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		0.142
(Goniophotometer - Section 4.2)		Non-Wroست Case		0.315
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		37.8
(Goniophotometer - Section 4.2)		Non-Wroست Case		37.5

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023/1/3	GUSJR4/40W/4000K	Q1
2	Goniophotometer Test	2023/1/3	GUSJR4/40W/4000K	Q1
3	THD and PF Test	2023/1/3	GUSJR4/40W/4000K	Q1

Remark(If any)

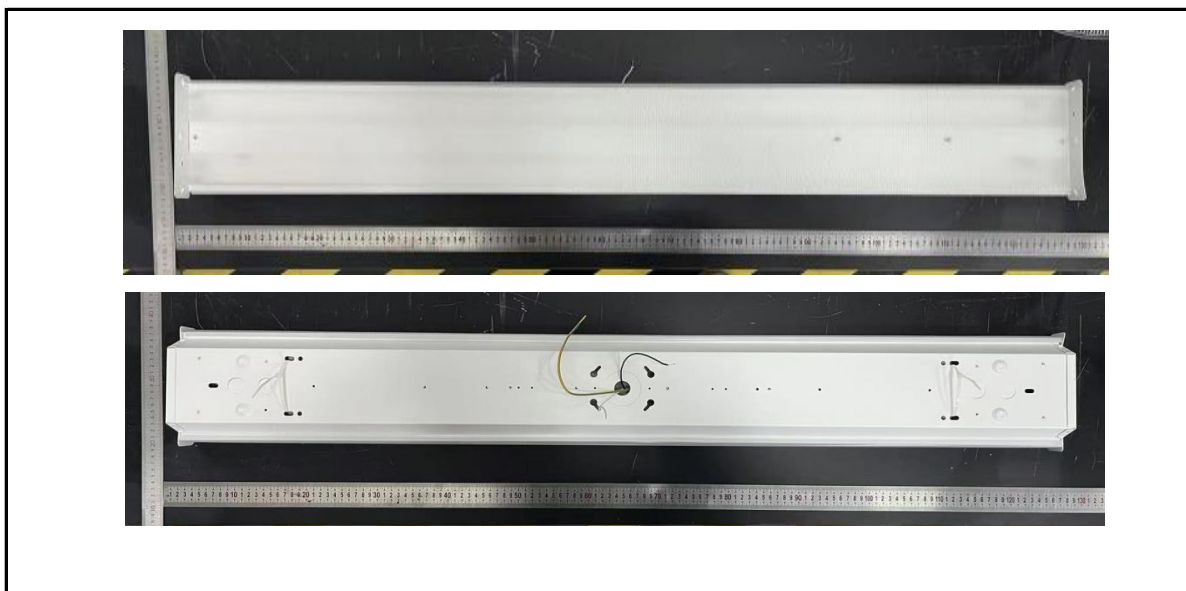
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3.0 Production Description

Luminaire Description: GUSJR4/40W/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.	GUSJR4/40W/4000K	Sample ID.	Q1
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

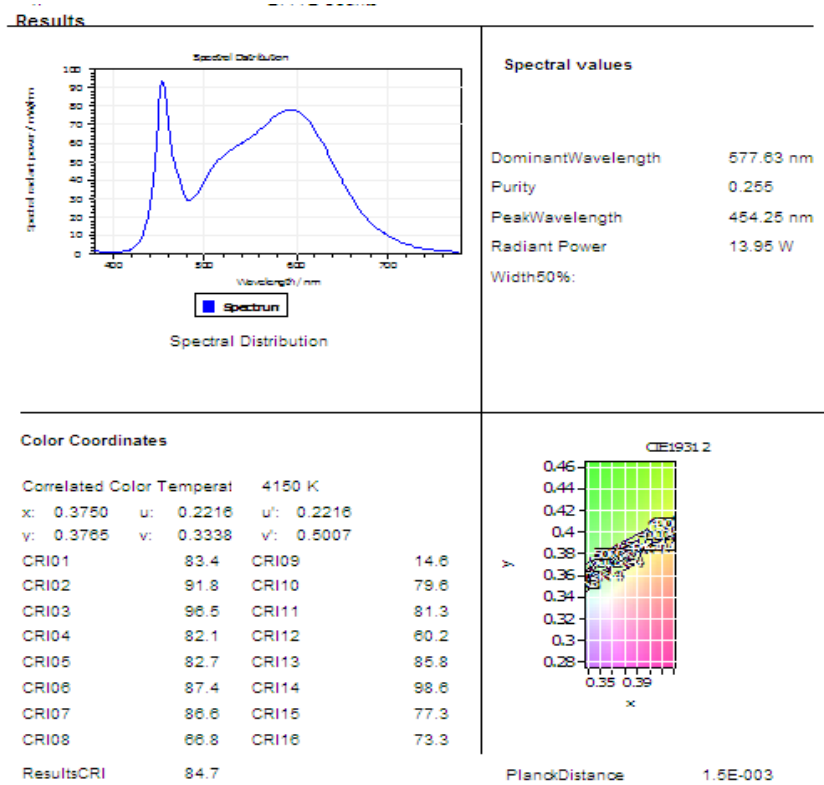
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.06	60	0.313	37.3	0.994
277.00	60	0.141	37.6	0.962

Test Result

CCT (K)	CRI	R9	Duv
4150	85	15	0.0015

Rf	Rg	IES Rcs,h1
84	93	-12%

4.1 Integrating Sphere Test



4.1 Integrating Sphere Test

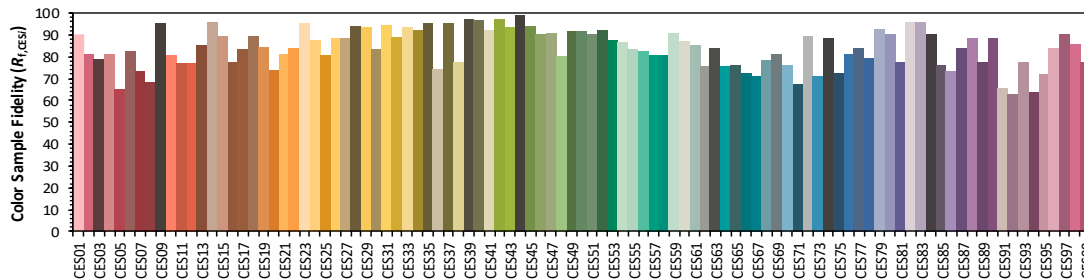
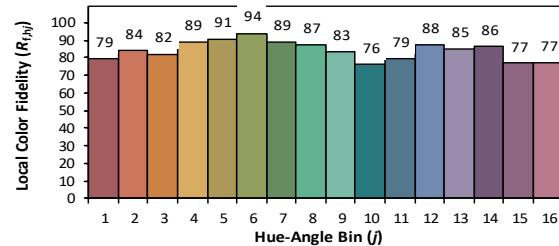
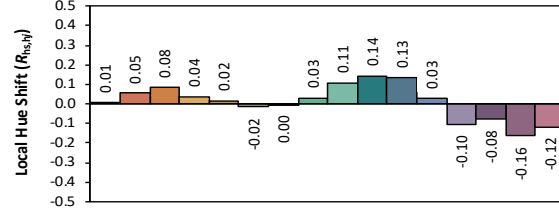
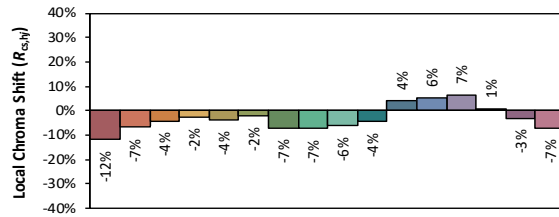
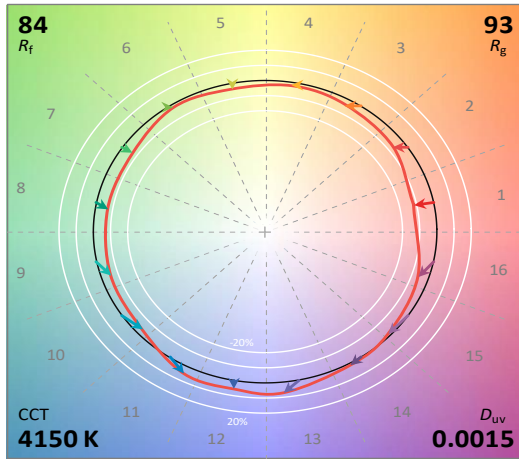
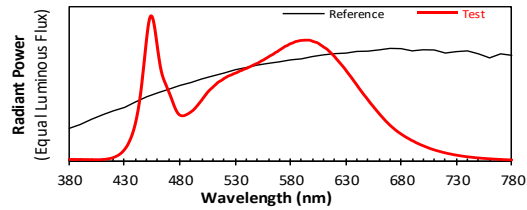
IES TM-30-18 Color Rendition Report

Source: DLF2212110-17a

Manufacturer: RAB Lighting Inc.

Date: 2023/1/3

Model: GUSJR4/40W/4000K



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

x 0.3750

y 0.3765

u' 0.2216

v' 0.5007

CIE 13.3-1995
(CRI)

R_a 85

R_9 17

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	GUSJR4/40W/4000K	Sample ID.	Q1
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	277.02	60	0.142	37.8	0.959
NON-WROST CASE	120.00	60	0.315	37.5	0.991

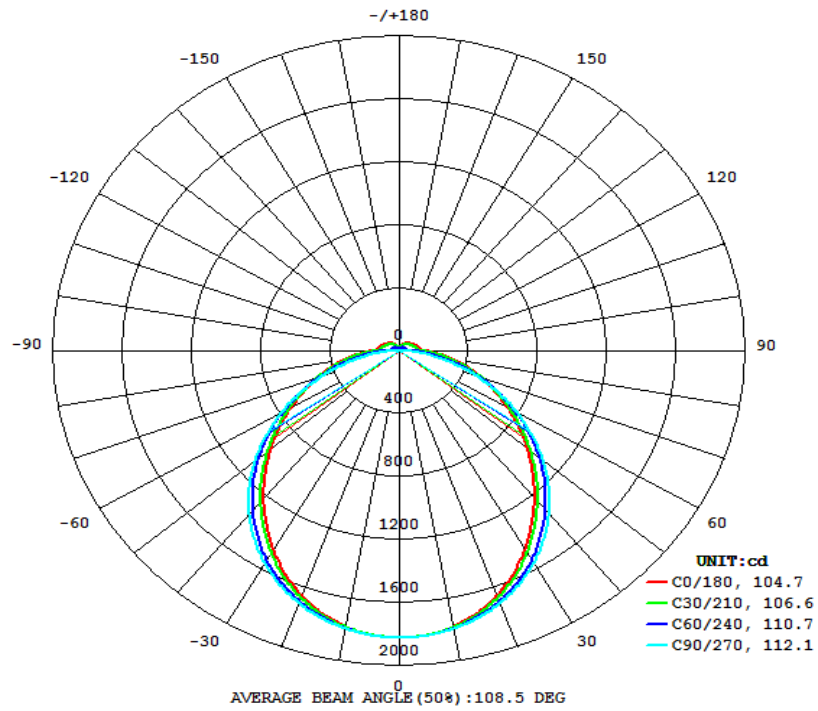
Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
5540	175.0	161.5	104.7	112.1	146.6

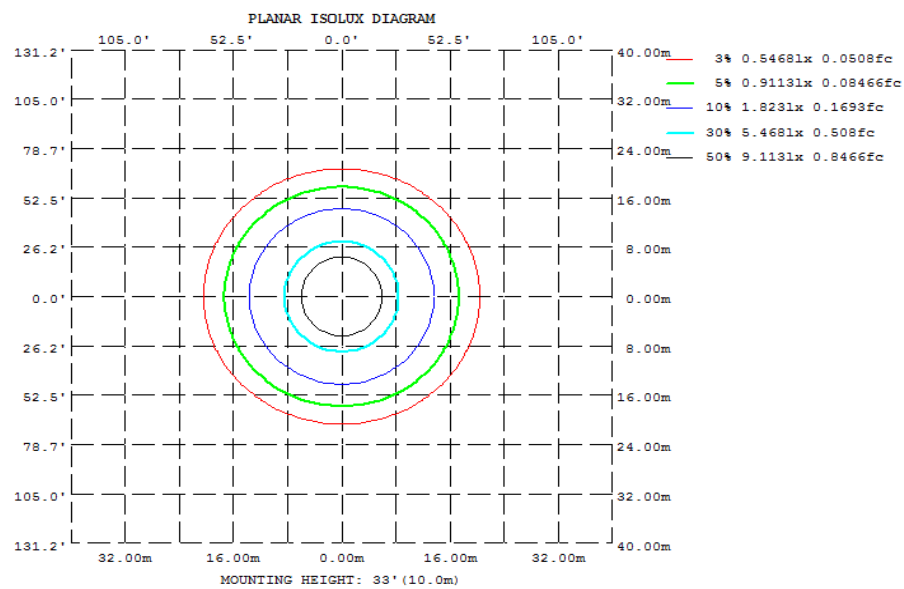
Zonal Lumen Requirement (0° - 60°)	UGR (X=4H, Y=8H, 70/50/20%)	Length(ft)	Lumen/ft
71.70%	23.4	4.00	1385

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	1781	1787	1793	1787	1781	1787	1793	1787
20	1655	1680	1705	1680	1655	1680	1705	1680
30	1457	1506	1558	1506	1457	1506	1558	1506
40	1221	1281	1351	1281	1221	1281	1351	1281
50	969.4	1027	1091	1027	969.4	1027	1091	1027
60	725.4	758.4	789.9	758.4	725.4	758.4	789.9	758.4
70	506.9	504.1	482.6	504.1	506.9	504.1	482.6	504.1
80	314.4	277.4	197.3	277.4	314.4	277.4	197.3	277.4
90	148.4	101.8	1.504	101.8	148.4	101.8	1.504	101.8
100	126.2	87.67	2.398	87.67	126.2	87.67	2.398	87.67
110	109.5	76.94	5.380	76.94	109.5	76.94	5.380	76.94
120	94.24	66.25	8.059	66.25	94.24	66.25	8.059	66.25
130	79.46	57.11	10.19	57.11	79.46	57.11	10.19	57.11
140	66.28	47.33	12.00	47.33	66.28	47.33	12.00	47.33
150	51.44	36.49	12.62	36.49	51.44	36.49	12.62	36.49
160	35.64	25.00	12.35	25.00	35.64	25.00	12.35	25.00
170	20.58	15.62	11.28	15.62	20.58	15.62	11.28	15.62
180	10.89	12.10	12.42	12.10	10.89	12.10	12.42	12.10
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	18.1	19.6	18.5	20.0	20.5	17.9	19.4	18.4	19.9	20.4
4H	19.7	21.0	20.1	21.5	22.0	20.0	21.3	20.5	21.8	22.3
6H	20.2	21.5	20.7	22.0	22.5	20.9	22.2	21.4	22.6	23.2
8H	20.5	21.7	21.0	22.2	22.8	21.8	23.0	22.3	23.5	24.0
12H	20.6	21.7	21.2	22.3	22.8	22.2	23.3	22.7	23.8	24.4
4H	20.7	21.7	21.2	22.3	22.8	22.6	23.7	23.1	24.2	24.8
4H	2H	18.7	19.9	19.2	20.4	20.9	18.5	19.8	19.0	20.3
3H	20.5	21.5	21.0	22.1	22.6	20.8	21.9	21.3	22.4	22.9
4H	21.1	22.1	21.7	22.7	23.3	21.8	22.8	22.4	23.4	24.0
6H	21.6	22.5	22.2	23.0	23.6	22.9	23.7	23.5	24.3	24.9
8H	21.7	22.5	22.3	23.1	23.7	23.4	24.2	24.0	24.8	25.4
12H	21.8	22.5	22.4	23.1	23.7	23.9	24.6	24.5	25.2	25.8
8H	4H	21.5	22.3	22.1	22.9	23.5	22.1	22.9	22.7	23.5
6H	22.1	22.8	22.7	23.4	24.0	23.3	24.0	23.9	24.6	25.2
8H	22.3	22.9	22.9	23.5	24.2	24.0	24.6	24.6	25.2	25.8
12H	22.4	23.0	23.0	23.6	24.3	24.6	25.1	25.2	25.7	26.5
12H	4H	21.6	22.3	22.2	22.9	23.5	22.2	22.9	22.7	23.5
6H	22.3	22.9	22.9	23.4	24.1	23.4	24.0	24.0	24.6	25.3
8H	22.5	23.0	23.1	23.6	24.3	24.1	24.6	24.7	25.2	25.9
Maximum UGR = 26.5										

4.2 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	172.26	0 - 10	172.26	3.11%
10-20	491.37	0 - 20	663.63	11.98%
20-30	737.48	0 - 30	1401.11	25.29%
30-40	875.62	0 - 40	2276.73	41.10%
40-50	894.87	0 - 50	3171.60	57.25%
50-60	800.08	0 - 60	3971.68	71.70%
60-70	621.31	0 - 70	4592.99	82.91%
70-80	401.15	0 - 80	4994.14	90.15%
80-90	184.38	0 - 90	5178.52	93.48%
90-100	89.76	0 - 100	5268.28	95.10%
100-110	76.54	0 - 110	5344.82	96.48%
110-120	63.17	0 - 120	5407.99	97.62%
120-130	49.64	0 - 130	5457.63	98.52%
130-140	36.63	0 - 140	5494.26	99.18%
140-150	24.54	0 - 150	5518.80	99.62%
150-160	13.78	0 - 160	5532.58	99.87%
160-170	5.76	0 - 170	5538.34	99.98%
170-180	1.30	0 - 180	5539.64	100.00%

4.2 Goniophotometer Test

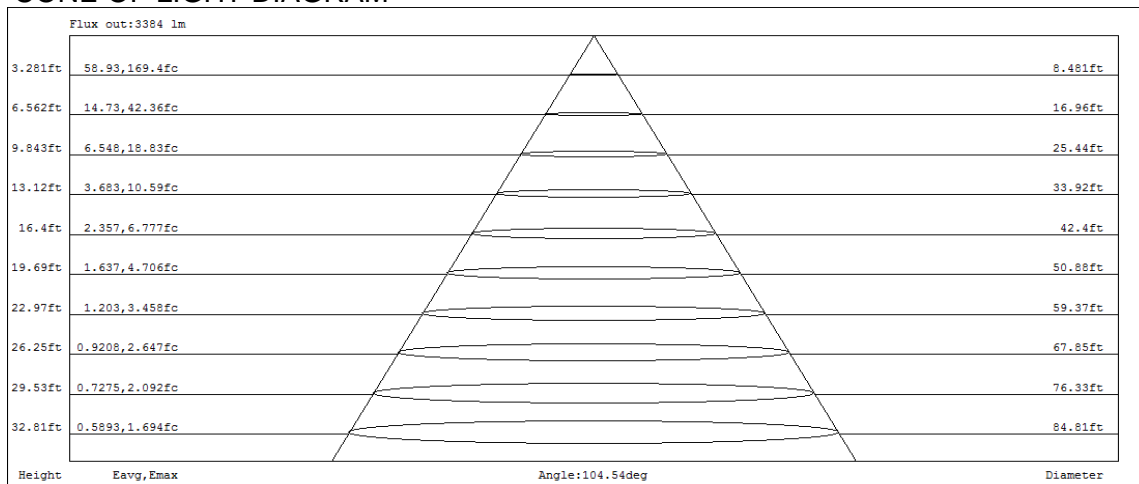
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	102	102	102	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	88	81	75	93	86	79	74	81	76	71	77	72	69	73	69	66	64
3	88	77	69	62	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	45	72	60	51	45	57	49	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	34
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	35	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	24
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.	GUSJR4/40W/4000 K	Sample ID.	Q1
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
120.06	60	0.313	37.3	0.994	8.36%
277.00	60	0.141	37.6	0.962	6.62%

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*****