

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

DLF2212110-14a

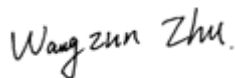
Test Date

2023/1/3

Issue Date

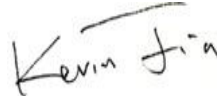
2023/1/5

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		4302
Lumen/ft (Goniophotometer - Section 4.2)	IES LM-79-2008	≥375		1076
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 115	Premium 130	149.9
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		28.7
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	6.51%
		20.00%	277V	7.47%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.994
		0.9	277V	0.920
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3985±275	4152
		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%		71.71%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22		22.5
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		0.113
(Goniophotometer - Section 4.2)		Non-Wroست Case		0.232
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		28.7
(Goniophotometer - Section 4.2)		Non-Wroست Case		27.5

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023/1/3	GUSJR4/30W/4000K	N1
2	Goniophotometer Test	2023/1/3	GUSJR4/30W/4000K	N1
3	THD and PF Test	2023/1/3	GUSJR4/30W/4000K	N1

Remark(If any)

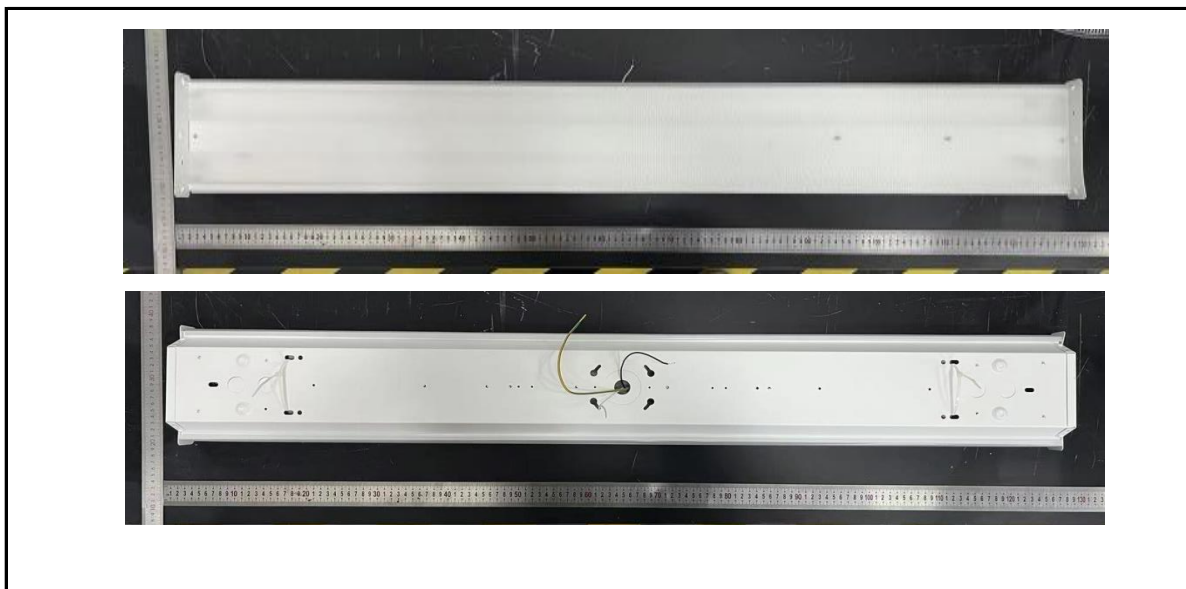
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3.0 Production Description

Luminaire Description: GUSJR4/30W/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.	GUSJR4/30W/4000K	Sample ID.	N1
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
120.05	60	0.230	27.4	0.994
276.96	60	0.112	28.6	0.920

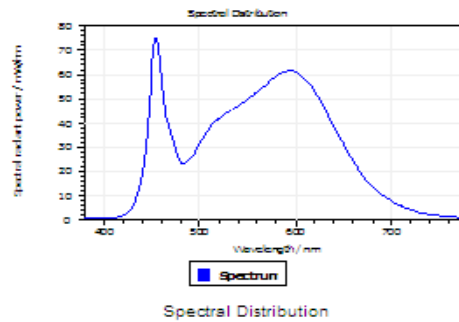
Test Result

CCT (K)	CRI	R9	Duv
4152	85	15	0.0015

Rf	Rg	IES Rcs,h1
84	93	-12%

4.1 Integrating Sphere Test

Results

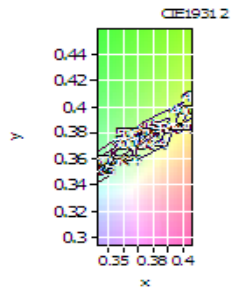


Spectral values

DominantWavelength 577.62 nm
Purity 0.255
PeakWavelength 454.42 nm
Radiant Power 10.98 W
Width50%:

Color Coordinates

Correlated Color Temperat 4152 K
x: 0.3749 u: 0.2216 u': 0.2216
y: 0.3764 v: 0.3337 v': 0.5006
CRI01 83.6 CRI09 15.3
CRI02 92.1 CRI10 80.3
CRI03 96.6 CRI11 81.4
CRI04 82.0 CRI12 60.1
CRI05 82.9 CRI13 86.2
CRI06 87.8 CRI14 98.7
CRI07 86.5 CRI15 77.6
CRI08 66.9 CRI16 73.3
ResultsCRI 84.8



PlanckDistance 1.5E-003

4.1 Integrating Sphere Test

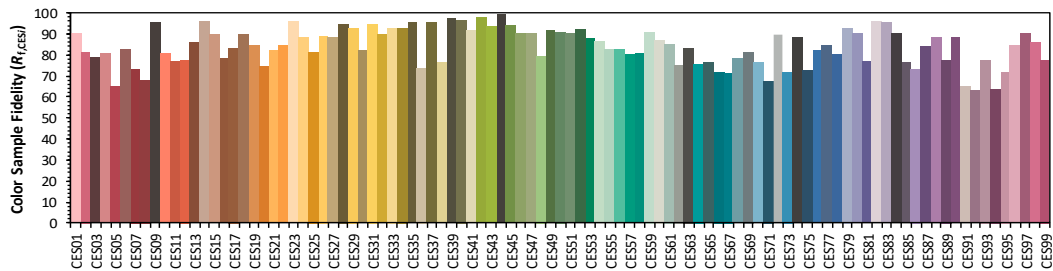
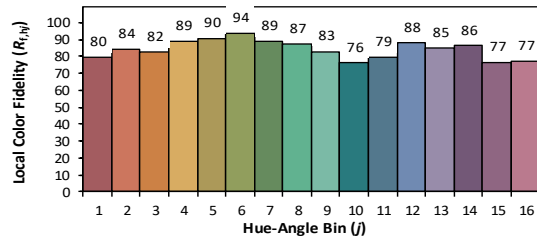
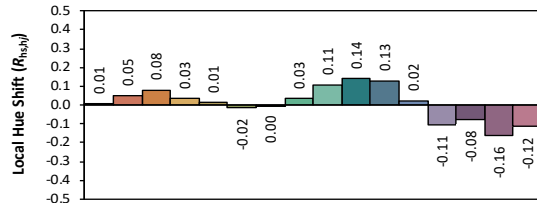
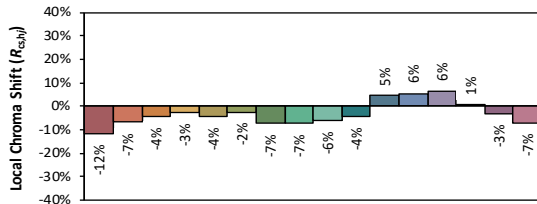
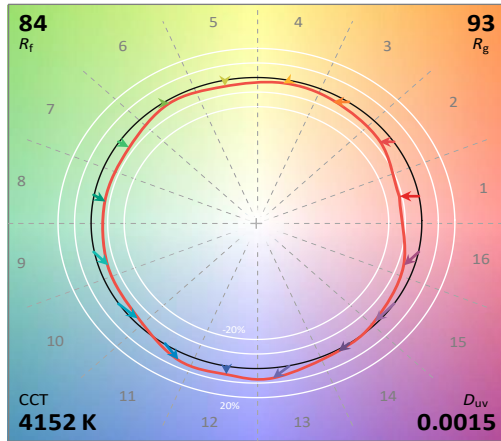
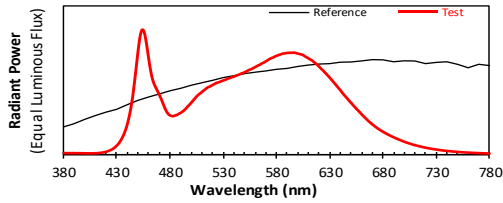
IES TM-30-18 Color Rendition Report

Source: DLF2212110-14a

Manufacturer: RAB Lighting Inc.

Date: 2023/1/3

Model: GUSJR4/30W/4000K



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

x 0.3749
 y 0.3764
 u' 0.2216
 v' 0.5006

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.	GUSJR4/30W/4000K	Sample ID.	N1
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	277.01	60	0.113	28.7	0.915
NON-WROST CASE	119.97	60	0.232	27.5	0.989

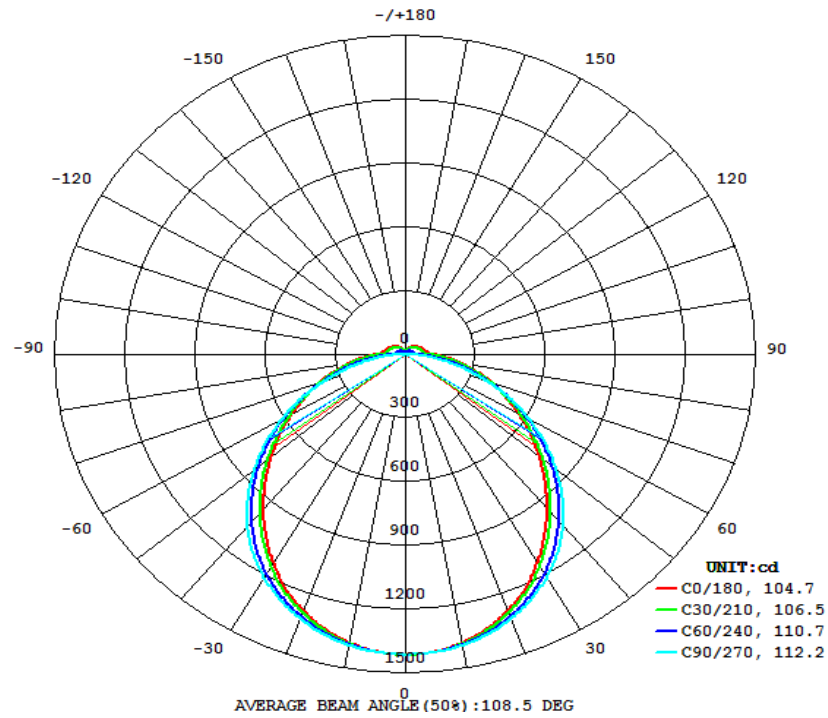
Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
4302	175.0	161.3	104.7	112.2	149.9

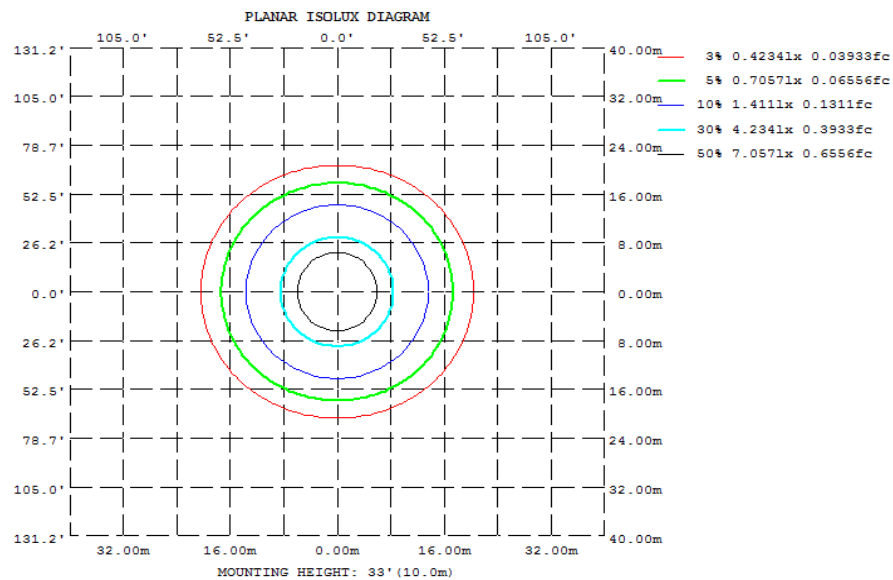
Zonal Lumen Requirement (0° - 60°)	UGR (X=4H, Y=8H, 70/50/20%)	Length(ft)	Lumen/ft
71.71%	22.5	4.00	1076

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	1380	1386	1390	1386	1380	1386	1390	1386
20	1283	1304	1322	1304	1283	1304	1322	1304
30	1132	1173	1214	1173	1132	1173	1214	1173
40	945.6	997.3	1052	997.3	945.6	997.3	1052	997.3
50	752.7	797.0	847.4	797.0	752.7	797.0	847.4	797.0
60	564.1	590.7	615.3	590.7	564.1	590.7	615.3	590.7
70	393.5	391.4	374.8	391.4	393.5	391.4	374.8	391.4
80	243.8	215.5	153.9	215.5	243.8	215.5	153.9	215.5
90	116.7	79.76	2.163	79.76	116.7	79.76	2.163	79.76
100	97.71	67.91	1.739	67.91	97.71	67.91	1.739	67.91
110	84.72	59.58	4.146	59.58	84.72	59.58	4.146	59.58
120	72.93	51.36	6.193	51.36	72.93	51.36	6.193	51.36
130	61.43	44.23	7.820	44.23	61.43	44.23	7.820	44.23
140	51.27	36.66	9.210	36.66	51.27	36.66	9.210	36.66
150	39.79	28.28	9.660	28.28	39.79	28.28	9.660	28.28
160	27.56	19.33	9.573	19.33	27.56	19.33	9.573	19.33
170	15.91	12.11	8.770	12.11	15.91	12.11	8.770	12.11
180	7.475	9.234	9.518	9.234	7.475	9.234	9.518	9.234
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	UGR Viewed Crosswise					UGR Viewed Endwise				
Y=2H	17.2	18.7	17.6	19.1	19.6	17.0	18.5	17.5	19.0	19.5
3H	18.8	20.1	19.3	20.6	21.1	19.1	20.4	19.6	20.9	21.4
4H	19.3	20.6	19.8	21.1	21.6	20.0	21.3	20.5	21.8	22.3
6H	19.6	20.8	20.1	21.3	21.9	20.9	22.1	21.4	22.6	23.1
8H	19.7	20.9	20.3	21.4	21.9	21.3	22.4	21.8	22.9	23.5
12H	19.8	20.8	20.3	21.4	21.9	21.7	22.8	22.2	23.3	23.9
4H	2H	17.8	19.0	18.3	19.5	20.0	17.7	18.9	18.2	19.4
	3H	19.6	20.6	20.1	21.2	21.7	19.9	21.0	20.4	21.5
	4H	20.2	21.2	20.8	21.8	22.4	21.0	21.9	21.5	22.5
	6H	20.7	21.6	21.3	22.1	22.7	22.0	22.8	22.6	23.4
	8H	20.8	21.6	21.4	22.2	22.8	22.5	23.3	23.1	23.8
	12H	20.9	21.6	21.5	22.2	22.8	23.0	23.7	23.6	24.3
8H	4H	20.6	21.4	21.2	22.0	22.6	21.2	22.0	21.8	22.6
	6H	21.2	21.9	21.8	22.5	23.1	22.4	23.1	23.0	23.7
	8H	21.4	22.0	22.0	22.6	23.3	23.1	23.6	23.7	24.3
	12H	21.5	22.1	22.1	22.7	23.4	23.7	24.2	24.3	24.8
12H	4H	20.7	21.4	21.3	22.0	22.6	21.3	22.0	21.8	22.6
	6H	21.4	22.0	22.0	22.5	23.2	22.5	23.1	23.1	23.7
	8H	21.6	22.1	22.2	22.7	23.4	23.2	23.7	23.8	24.3
Maximum UGR = 25.5										

4.2 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	133.57	0 - 10	133.57	3.10%
10-20	381.03	0 - 20	514.60	11.96%
20-30	573.14	0 - 30	1087.74	25.28%
30-40	681.51	0 - 40	1769.25	41.12%
40-50	694.71	0 - 50	2463.96	57.27%
50-60	621.21	0 - 60	3085.17	71.71%
60-70	483.05	0 - 70	3568.22	82.94%
70-80	311.39	0 - 80	3879.61	90.18%
80-90	143.06	0 - 90	4022.67	93.50%
90-100	69.53	0 - 100	4092.20	95.12%
100-110	59.26	0 - 110	4151.46	96.49%
110-120	48.92	0 - 120	4200.38	97.63%
120-130	38.43	0 - 130	4238.81	98.52%
130-140	28.37	0 - 140	4267.18	99.18%
140-150	18.99	0 - 150	4286.17	99.63%
150-160	10.66	0 - 160	4296.83	99.87%
160-170	4.46	0 - 170	4301.29	99.98%
170-180	1.01	0 - 180	4302.30	100.00%

4.2 Goniophotometer Test

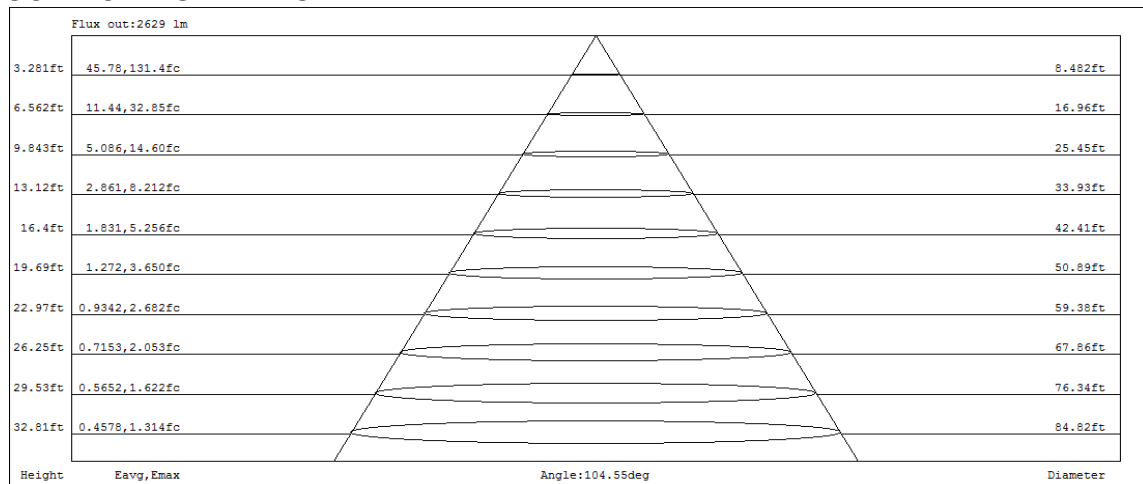
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	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	46	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	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	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.	GUSJR4/30W/4000 K	Sample ID.	N1
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
120.05	60	0.230	27.4	0.994	6.51%
276.96	60	0.112	28.6	0.920	7.47%

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*****