

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

DLF2212110-8a

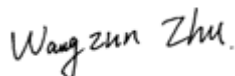
Test Date

2023/1/3

Issue Date

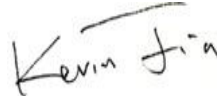
2023/1/5

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		2790
Lumen/ft (Goniophotometer - Section 4.2)	IES LM-79-2008	≥375		1395
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 115	Premium 130	143.8
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		19.4
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	6.86%
		20.00%	277V	6.80%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.995
		0.9	277V	0.973
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3985±275	4122
		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		14
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%		72.15%
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	Wrost Case		120
(Goniophotometer - Section 4.2)		Non-Wrost Case		277
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		0.163
(Goniophotometer - Section 4.2)		Non-Wrost Case		0.070
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		19.4
(Goniophotometer - Section 4.2)		Non-Wrost Case		19.0

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023/1/3	GUSJR2/20W/4000K	H1
2	Goniophotometer Test	2023/1/3	GUSJR2/20W/4000K	H1
3	THD and PF Test	2023/1/3	GUSJR2/20W/4000K	H1

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.

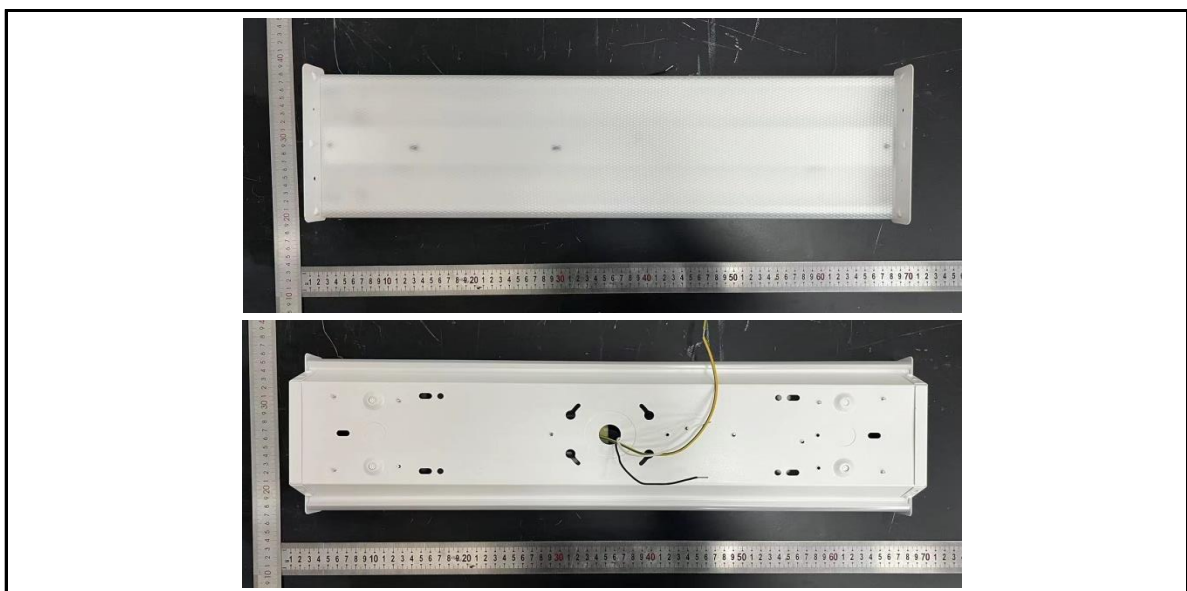
2、 The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing 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: GUSJR2/20W/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.	GUSJR2/20W/4000K	Sample ID.	H1
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
119.96	60	0.160	19.1	0.995
276.98	60	0.069	18.7	0.973

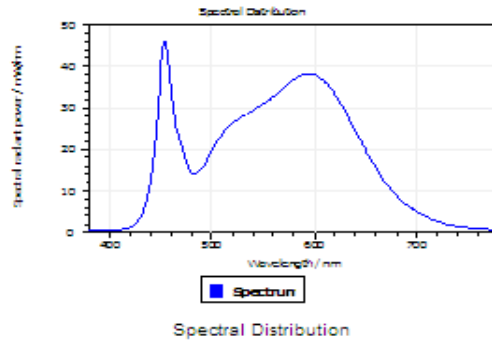
Test Result

CCT (K)	CRI	R9	Duv
4122	85	14	0.0015

Rf	Rg	IES Rcs,h1
85	95	-12%

4.1 Integrating Sphere Test

Results



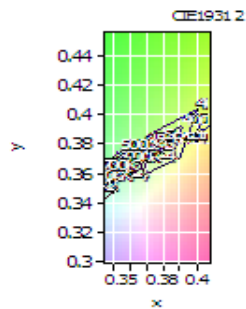
Spectral values

DominantWavelength 577.75 nm
Purity 0.261
PeakWavelength 454.04 nm
Radiant Power 6.854 W
Width50%:

Color Coordinates

Correlated Color Temperat 4122 K
x: 0.3761 u: 0.2221 u': 0.2221
y: 0.3772 v: 0.3341 v': 0.5012

CRI01	83.2	CRI09	13.7
CRI02	92.1	CRI10	80.7
CRI03	96.3	CRI11	81.2
CRI04	81.8	CRI12	62.0
CRI05	83.0	CRI13	85.8
CRI06	88.5	CRI14	98.5
CRI07	85.6	CRI15	76.5
CRI08	65.5	CRI16	72.7
ResultsCRI	84.5		



PlankDistance 1.5E-003

4.1 Integrating Sphere Test

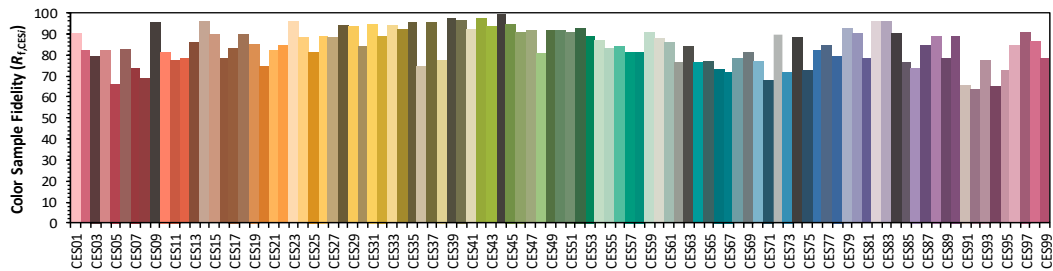
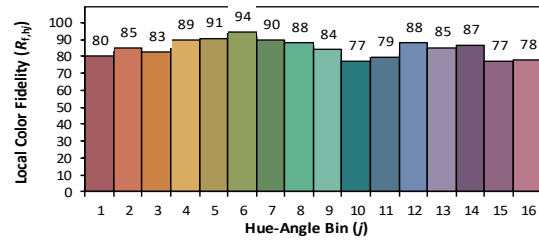
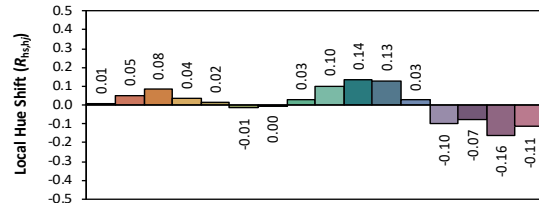
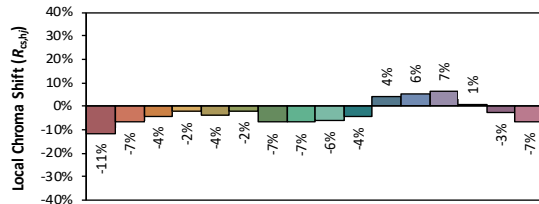
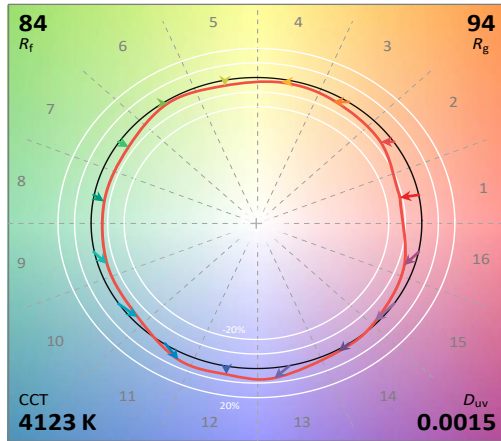
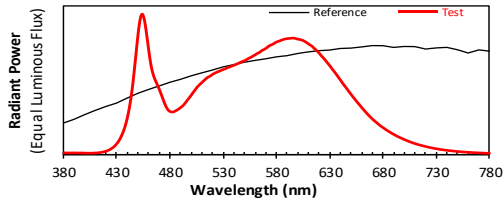
IES TM-30-18 Color Rendition Report

Source: DLF2212110-8a

Manufacturer: RAB Lighting Inc.

Date: 2023/1/3

Model: GUSJR2/20W/4000K



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

x 0.3761
 y 0.3772
 u' 0.2221
 v' 0.5012

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.	GUSJR2/20W/4000K	Sample ID.	H1
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	119.98	60	0.163	19.4	0.995
NON-WROST CASE	277.00	60	0.070	19.0	0.973

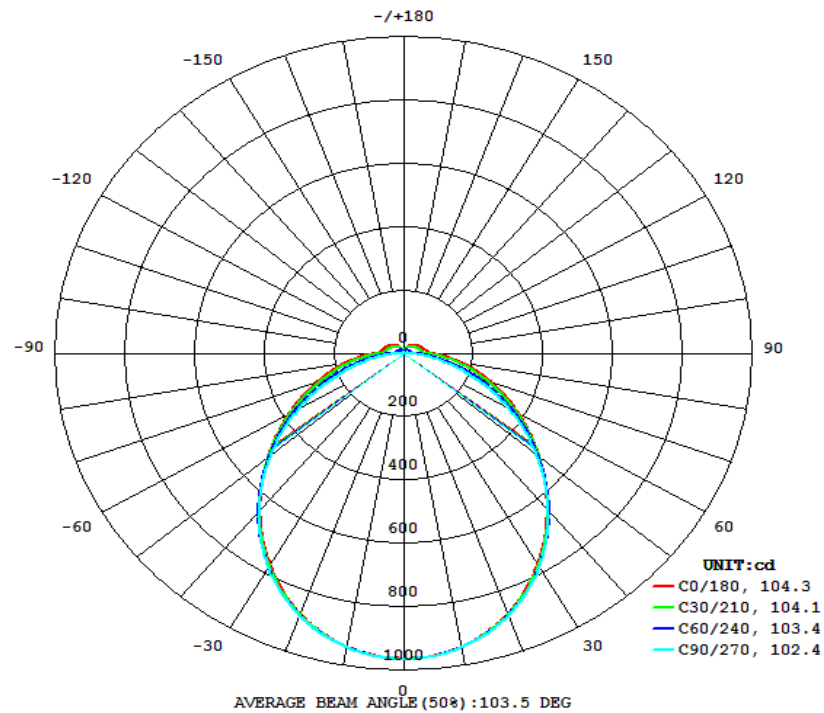
Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
2790	175.6	158.1	104.3	102.4	143.8

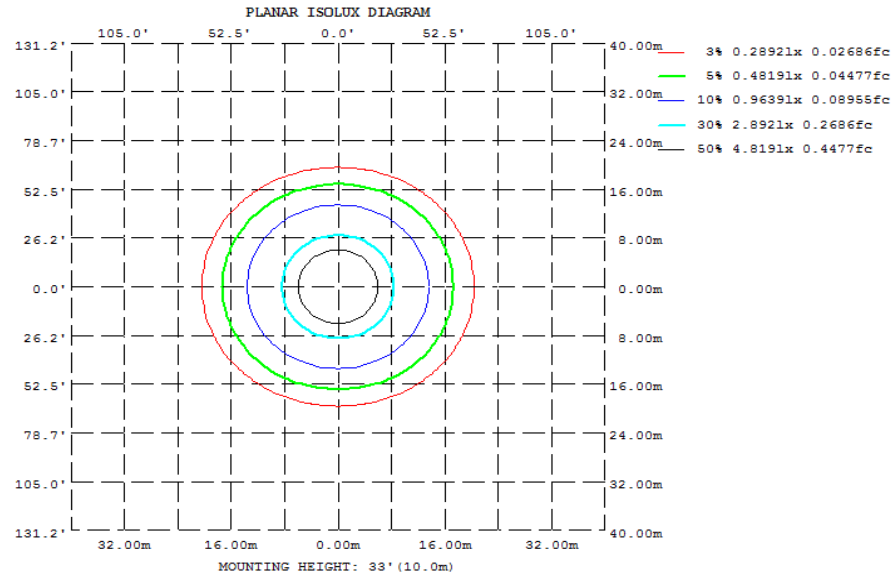
Zonal Lumen Requirement (0° - 60°)	UGR (X=4H, Y=8H, 70/50/20%)	Length(ft)	Lumen/ft
72.15%	23.4	2.00	1395

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	940.4	941.5	942.3	941.5	940.4	941.5	942.3	941.5
20	873.8	878.2	879.8	878.2	873.8	878.2	879.8	878.2
30	769.9	776.7	779.3	776.7	769.9	776.7	779.3	776.7
40	643.1	649.0	648.2	649.0	643.1	649.0	648.2	649.0
50	509.9	508.9	499.7	508.9	509.9	508.9	499.7	508.9
60	382.7	370.3	349.4	370.3	382.7	370.3	349.4	370.3
70	270.2	244.3	208.1	244.3	270.2	244.3	208.1	244.3
80	170.5	134.8	87.03	134.8	170.5	134.8	87.03	134.8
90	80.27	50.42	1.132	50.42	80.27	50.42	1.132	50.42
100	68.37	43.09	1.894	43.09	68.37	43.09	1.894	43.09
110	59.78	38.53	2.863	38.53	59.78	38.53	2.863	38.53
120	51.75	33.88	4.431	33.88	51.75	33.88	4.431	33.88
130	43.71	29.60	5.903	29.60	43.71	29.60	5.903	29.60
140	36.31	25.33	7.175	25.33	36.31	25.33	7.175	25.33
150	28.52	19.77	8.089	19.77	28.52	19.77	8.089	19.77
160	19.87	14.57	8.302	14.57	19.87	14.57	8.302	14.57
170	11.23	8.862	6.553	8.862	11.23	8.862	6.553	8.862
180	3.183	5.452	6.159	5.452	3.183	5.452	6.159	5.452
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	17.2	18.7	17.7	19.2	19.6	17.9	19.4	18.4	19.9	20.4
4H	18.7	20.0	19.2	20.5	21.0	20.0	21.3	20.5	21.8	22.3
6H	19.2	20.5	19.7	21.0	21.5	20.9	22.2	21.4	22.7	23.2
8H	19.5	20.7	20.1	21.2	21.8	21.8	23.0	22.3	23.5	24.0
12H	19.6	20.7	20.2	21.3	21.8	22.2	23.3	22.8	23.9	24.4
4H	19.6	20.7	20.2	21.2	21.8	22.6	23.7	23.1	24.2	24.8
2H	17.9	19.1	18.4	19.6	20.2	18.4	19.7	19.0	20.2	20.7
3H	19.6	20.7	20.1	21.2	21.8	20.7	21.8	21.3	22.3	22.9
4H	20.2	21.2	20.8	21.7	22.3	21.8	22.8	22.3	23.3	23.9
6H	20.7	21.5	21.2	22.1	22.7	22.9	23.7	23.4	24.3	24.9
8H	20.8	21.6	21.3	22.1	22.8	23.4	24.2	23.9	24.7	25.4
12H	20.8	21.6	21.4	22.1	22.8	23.9	24.6	24.4	25.2	25.8
8H	20.7	21.4	21.2	22.0	22.6	22.0	22.8	22.6	23.4	24.0
6H	21.2	21.9	21.8	22.5	23.1	23.3	23.9	23.9	24.5	25.2
4H	21.4	22.0	22.0	22.6	23.3	23.9	24.5	24.5	25.1	25.7
12H	21.5	22.1	22.1	22.7	23.4	24.5	25.1	25.1	25.7	26.4
12H	20.7	21.5	21.3	22.1	22.7	22.1	22.8	22.6	23.4	24.0
6H	21.4	22.0	22.0	22.6	23.3	23.3	23.9	23.9	24.5	25.2
8H	21.6	22.1	22.2	22.8	23.5	24.0	24.5	24.6	25.1	25.8
Maximum UGR = 26.4										

4.2 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	90.91	0 - 10	90.91	3.26%
10-20	257.73	0 - 20	348.64	12.49%
20-30	382.24	0 - 30	730.88	26.19%
30-40	446.12	0 - 40	1177.00	42.18%
40-50	445.59	0 - 50	1622.59	58.15%
50-60	390.74	0 - 60	2013.33	72.15%
60-70	300.30	0 - 70	2313.63	82.92%
70-80	195.28	0 - 80	2508.91	89.92%
80-90	92.25	0 - 90	2601.16	93.22%
90-100	45.58	0 - 100	2646.74	94.86%
100-110	39.35	0 - 110	2686.09	96.27%
110-120	32.92	0 - 120	2719.01	97.45%
120-130	26.26	0 - 130	2745.27	98.39%
130-140	19.67	0 - 140	2764.94	99.09%
140-150	13.47	0 - 150	2778.41	99.57%
150-160	7.80	0 - 160	2786.21	99.85%
160-170	3.39	0 - 170	2789.60	99.97%
170-180	0.70	0 - 180	2790.30	100.00%

4.2 Goniophotometer Test

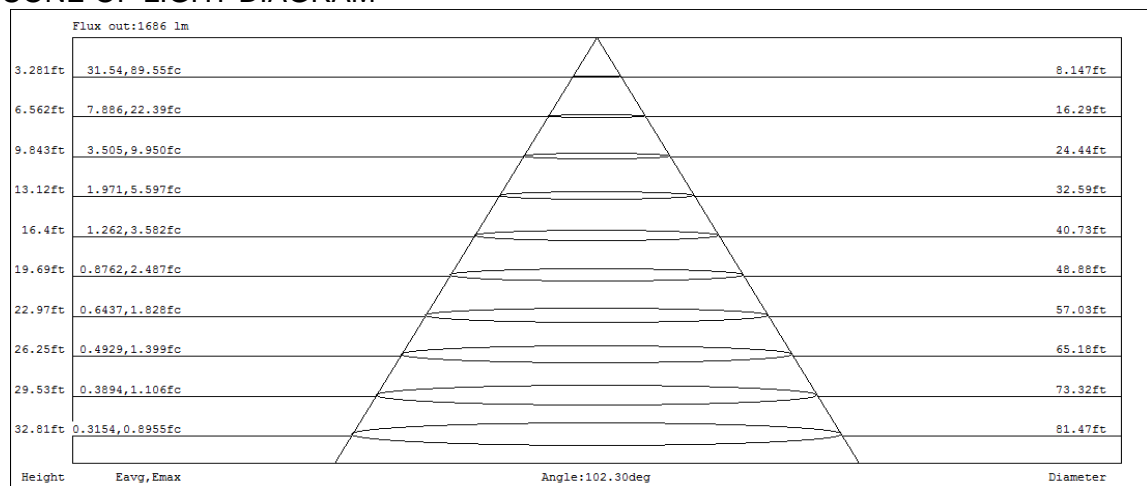
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0
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	101	101	101	96	96	96	93
1	107	102	97	93	103	99	95	91	93	90	87	88	86	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	54	78	67	59	53	64	57	51	61	55	50	58	53	49	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	67	54	46	40	52	44	39	50	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	60	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	36	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.	GUSJR2/20W/4000 K	Sample ID.	H1
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
119.96	60	0.160	19.1	0.995	6.86%
276.98	60	0.069	18.7	0.973	6.80%

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*****