

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

DLF2212110-7a

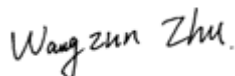
Test Date

2023/1/3

Issue Date

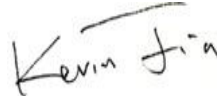
2023/1/5

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	750		2550
Lumen/ft (Goniophotometer - Section 4.2)	IES LM-79-2008	≥375		1275
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 115	Premium 130	126.2
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		20.2
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	6.46%
		20.00%	277V	7.23%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.996
		0.9	277V	0.977
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3465±245	3444
		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%		72.20%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22		23.1
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		120
(Goniophotometer - Section 4.2)		Non-Wroست Case		277
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		0.169
(Goniophotometer - Section 4.2)		Non-Wroست Case		0.073
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wroست Case		20.2
(Goniophotometer - Section 4.2)		Non-Wroست Case		19.7

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023/1/3	GUSJR2/20W/3500K	G1
2	Goniophotometer Test	2023/1/3	GUSJR2/20W/3500K	G1
3	THD and PF Test	2023/1/3	GUSJR2/20W/3500K	G1

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.

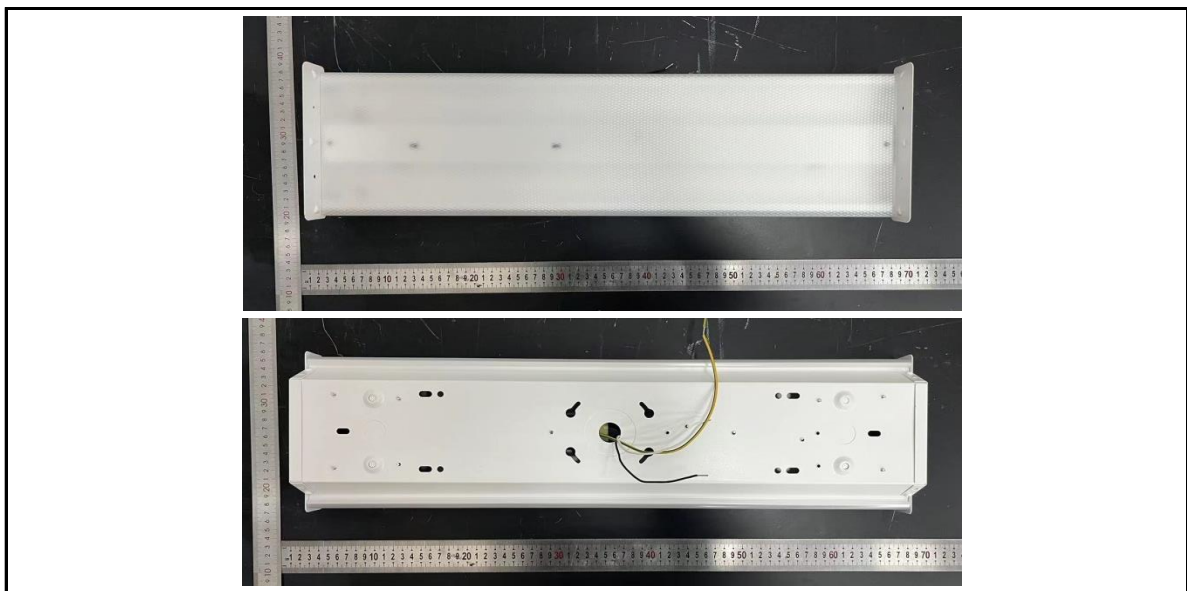
2、 The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing 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/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.	GUSJR2/20W/3500K	Sample ID.	G1
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	0.169	20.2	0.996
277.04	60	0.073	19.7	0.977

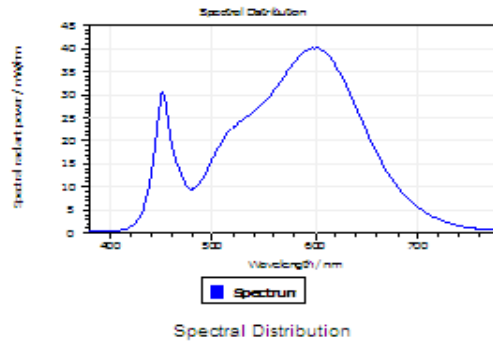
Test Result

CCT (K)	CRI	R9	Duv
3444	83	9	0.0014

Rf	Rg	IES Rcs,h1
85	95	-12%

4.1 Integrating Sphere Test

Results



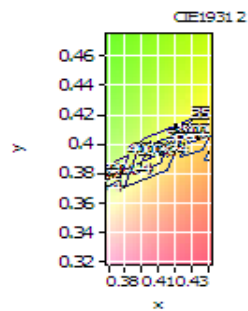
Spectral values

DominantWavelength 580.53 nm
Purity 0.420
PeakWavelength 589.19 nm
Radiant Power 6.473 W
Width50%:

Color Coordinates

Correlated Color Temperat 3444 K
x: 0.4100 u: 0.2365 u': 0.2365
y: 0.3962 v: 0.3428 v': 0.5142

CRI01	81.3	CRI09	8.6
CRI02	89.9	CRI10	76.6
CRI03	96.6	CRI11	81.4
CRI04	82.1	CRI12	65.8
CRI05	81.6	CRI13	83.3
CRI06	87.1	CRI14	98.3
CRI07	85.2	CRI15	74.2
CRI08	62.4	CRI16	71.9
ResultsCRI	83.3		



PlankDistance 1.4E-003

4.1 Integrating Sphere Test

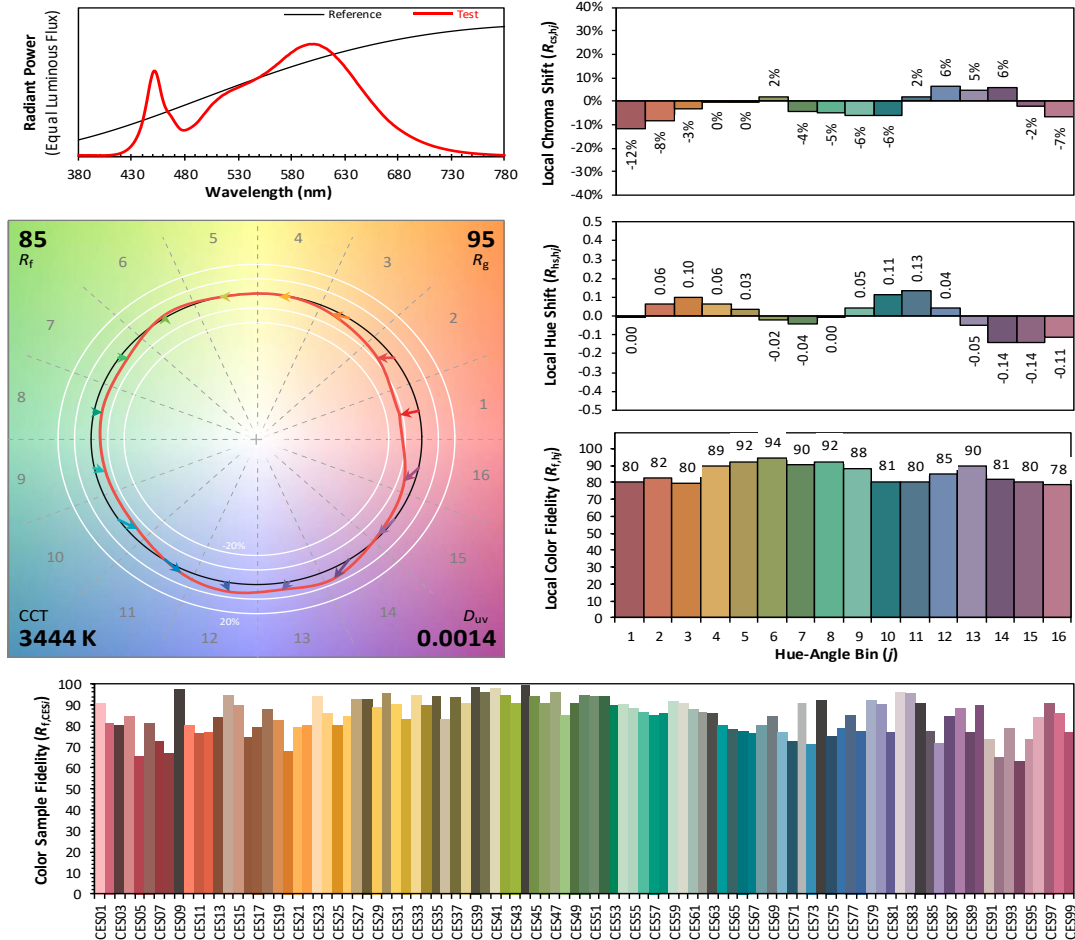
IES TM-30-18 Color Rendition Report

Source: DLF2212110-7a

Manufacturer: RAB Lighting Inc.

Date: 2023/1/3

Model: GUSJR2/20W/3500K



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

x 0.4100
 y 0.3962
 u' 0.2365
 v' 0.5142

CIE 13.3-1995
 (CRI)

R_a 84
 R_g 13

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	GUSJR2/20W/3500K	Sample ID.	G1
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	120.02	60	0.169	20.2	0.995
NON-WROST CASE	277.01	60	0.073	19.7	0.976

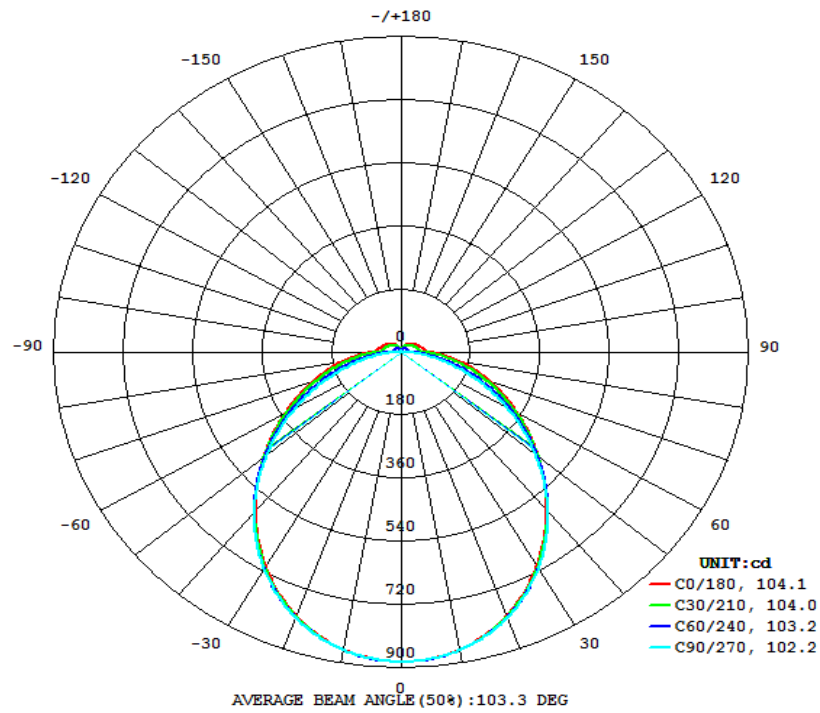
Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
2550	175.6	158.4	104.1	102.2	126.2

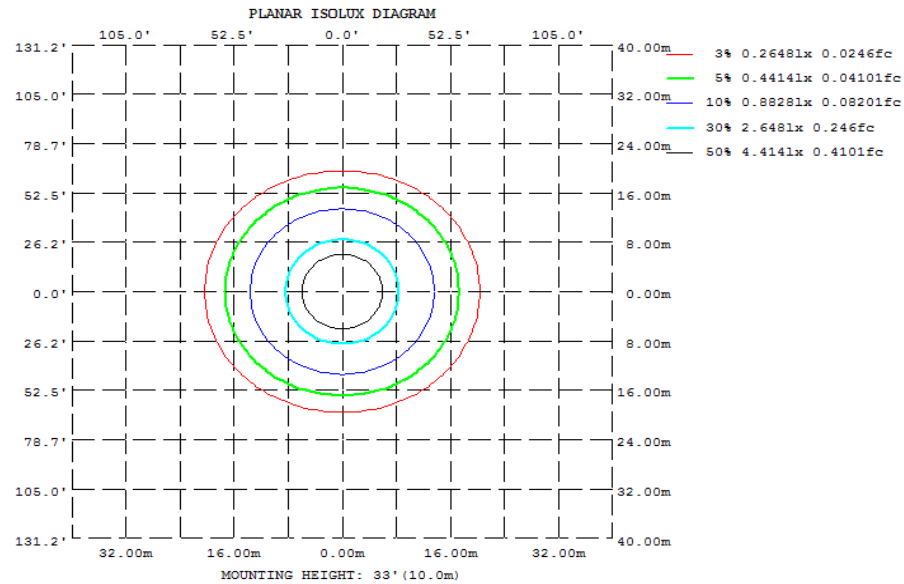
Zonal Lumen Requirement (0° - 60°)	UGR (X=4H, Y=8H, 70/50/20%)	Length(ft)	Lumen/ft
72.20%	23.1	2.00	1275

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	861.5	862.0	861.6	862.0	861.5	862.0	861.6	862.0
20	799.2	802.5	805.0	802.5	799.2	802.5	805.0	802.5
30	703.8	709.8	712.7	709.8	703.8	709.8	712.7	709.8
40	588.0	592.5	591.9	592.5	588.0	592.5	591.9	592.5
50	465.8	464.7	456.0	464.7	465.8	464.7	456.0	464.7
60	349.4	338.1	318.9	338.1	349.4	338.1	318.9	338.1
70	246.5	222.8	189.8	222.8	246.5	222.8	189.8	222.8
80	155.3	122.9	78.08	122.9	155.3	122.9	78.08	122.9
90	75.14	46.82	1.056	46.82	75.14	46.82	1.056	46.82
100	62.11	39.13	1.302	39.13	62.11	39.13	1.302	39.13
110	54.37	35.05	2.635	35.05	54.37	35.05	2.635	35.05
120	47.15	30.82	4.004	30.82	47.15	30.82	4.004	30.82
130	39.86	26.93	5.341	26.93	39.86	26.93	5.341	26.93
140	33.08	23.12	6.454	23.12	33.08	23.12	6.454	23.12
150	26.02	18.11	7.311	18.11	26.02	18.11	7.311	18.11
160	18.11	13.42	7.629	13.42	18.11	13.42	7.629	13.42
170	10.39	8.248	6.097	8.248	10.39	8.248	6.097	8.248
180	2.929	4.907	5.480	4.907	2.929	4.907	5.480	4.907
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		16.9	18.4	17.4	18.8	19.3	17.6	19.1	18.1	19.6	20.1
3H		18.4	19.7	18.9	20.2	20.7	19.7	21.0	20.2	21.5	22.0
4H		18.9	20.2	19.4	20.6	21.2	20.6	21.9	21.1	22.4	22.9
6H		19.2	20.4	19.7	20.9	21.4	21.5	22.7	22.0	23.2	23.7
8H		19.3	20.4	19.8	20.9	21.5	21.9	23.0	22.4	23.6	24.1
12H		19.3	20.4	19.9	20.9	21.5	22.3	23.4	22.8	23.9	24.5
4H	2H	17.6	18.8	18.1	19.3	19.9	18.1	19.4	18.7	19.9	20.4
	3H	19.3	20.4	19.8	20.9	21.4	20.4	21.5	21.0	22.0	22.6
	4H	19.9	20.9	20.4	21.4	22.0	21.5	22.5	22.0	23.0	23.6
	6H	20.3	21.2	20.9	21.8	22.4	22.6	23.4	23.1	24.0	24.6
	8H	20.5	21.3	21.0	21.8	22.4	23.1	23.9	23.6	24.4	25.0
	12H	20.5	21.2	21.1	21.8	22.5	23.5	24.3	24.1	24.9	25.5
8H	4H	20.3	21.1	20.9	21.7	22.3	21.7	22.5	22.3	23.1	23.7
	6H	20.9	21.6	21.5	22.2	22.8	23.0	23.6	23.6	24.2	24.9
	8H	21.1	21.7	21.7	22.3	23.0	23.6	24.2	24.2	24.8	25.4
	12H	21.2	21.7	21.8	22.3	23.1	24.2	24.7	24.8	25.4	26.1
12H	4H	20.4	21.2	21.0	21.7	22.4	21.8	22.5	22.3	23.1	23.7
	6H	21.1	21.7	21.7	22.3	22.9	23.0	23.6	23.6	24.2	24.9
	8H	21.3	21.8	21.9	22.4	23.2	23.7	24.2	24.3	24.8	25.5
Maximum UGR = 26.1											

4.2 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	83.26	0 - 10	83.26	3.27%
10-20	235.94	0 - 20	319.20	12.52%
20-30	349.74	0 - 30	668.94	26.24%
30-40	407.92	0 - 40	1076.86	42.23%
40-50	407.24	0 - 50	1484.10	58.20%
50-60	356.86	0 - 60	1840.96	72.20%
60-70	274.14	0 - 70	2115.10	82.95%
70-80	178.10	0 - 80	2293.20	89.94%
80-90	84.21	0 - 90	2377.41	93.24%
90-100	41.57	0 - 100	2418.98	94.87%
100-110	35.77	0 - 110	2454.75	96.27%
110-120	29.98	0 - 120	2484.73	97.45%
120-130	23.94	0 - 130	2508.67	98.39%
130-140	17.94	0 - 140	2526.61	99.09%
140-150	12.29	0 - 150	2538.90	99.57%
150-160	7.14	0 - 160	2546.04	99.85%
160-170	3.11	0 - 170	2549.15	99.97%
170-180	0.64	0 - 180	2549.79	100.00%

4.2 Goniophotometer Test

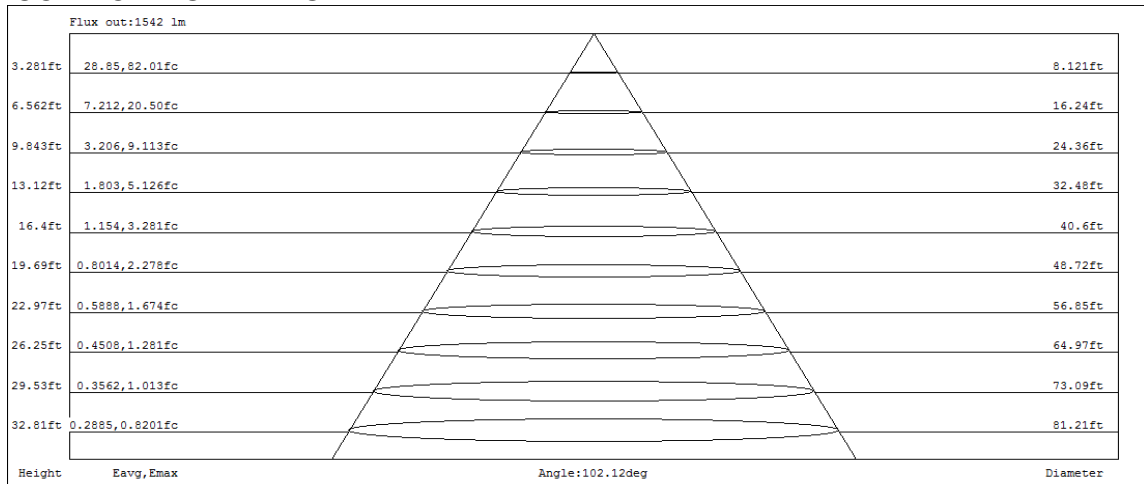
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	45	55	48	43	52	47	42	40
6	69	56	47	40	67	54	46	40	52	45	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/3500 K	Sample ID.	G1
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
120.02	60	0.169	20.2	0.996	6.46%
277.04	60	0.073	19.7	0.977	7.23%

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*****