

Photometric Test Report

Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77:2017

Prepared For RAB Lighting Inc.

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Project Number

DLF2305110

Report Number

DLF2305110-3a

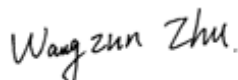
Test Date

2023/5/23

Issue Date

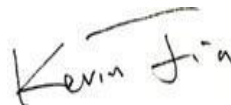
2023/5/25

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		2303
Lumen/ft (Goniophotometer - Section 4.2)	IES LM-79-2008	≥375		1151
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 115	Premium 130	131.6
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		17.5
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	5.03%
		20.00%	277V	9.65%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.996
		0.9	277V	0.951
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3465±245	3474
		4 step	3465±124	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥80		84
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥0		12
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		98
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-12%≤IES Rcs,h1≤+23%		-11%
Zonal Lumen Requirement (0°-60°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≥40%		73.94%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22		22.8
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		277
(Goniophotometer - Section 4.2)		Non-Wrost Case		120
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		0.066
(Goniophotometer - Section 4.2)		Non-Wrost Case		0.143
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		17.5
(Goniophotometer - Section 4.2)		Non-Wrost Case		17.1

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023/5/23	CW2/17W/3500K	C1
2	Goniophotometer Test	2023/5/23	CW2/17W/3500K	C1
3	THD and PF Test	2023/5/23	CW2/17W/3500K	C1

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.

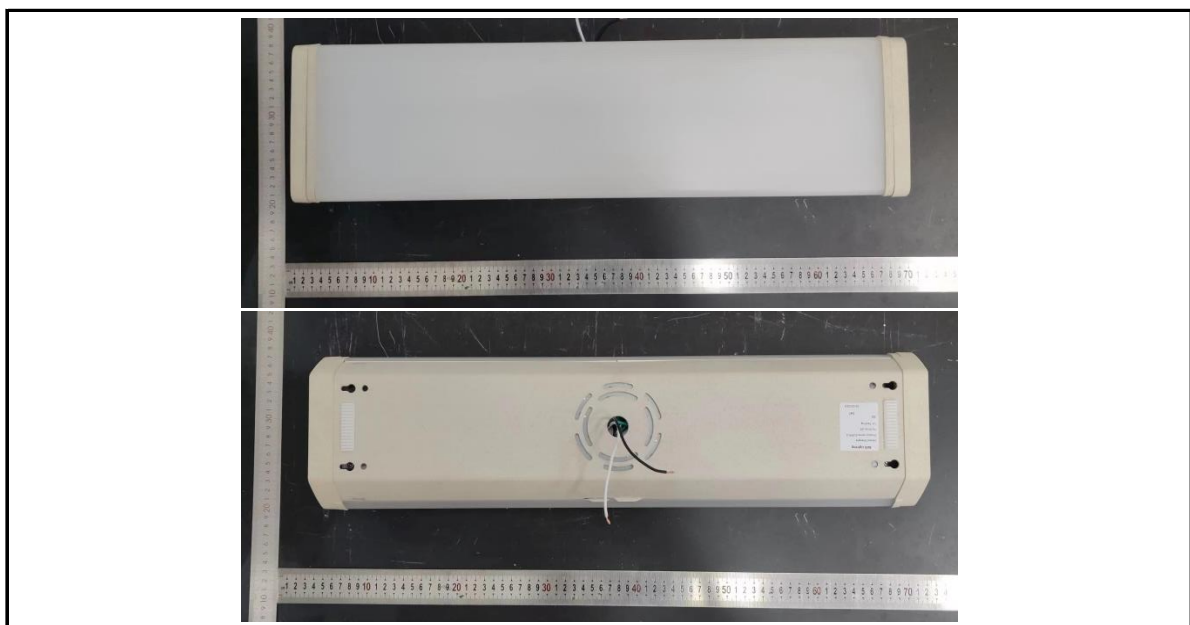
2、 The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing 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: CW2/17W/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.	CW2/17W/3500K	Sample ID.	C1
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
119.97	60	0.143	17.1	0.996
277.00	60	0.066	17.5	0.951

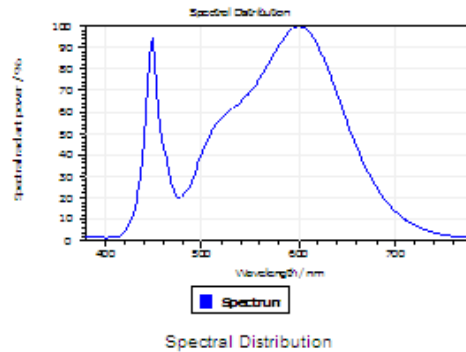
Test Result

CCT (K)	CRI	R9	Duv
3474	84	12	0.0023

Rf	Rg	IES Rcs,h1
84	98	-11%

4.1 Integrating Sphere Test

Results



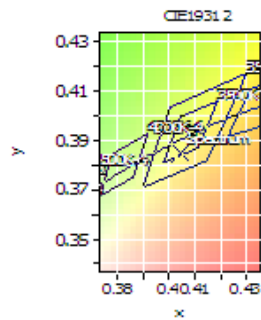
Spectral values

DominantWavelength 582.03 nm
Purity 0.369
PeakWavelength 600.41 nm
Radiant Power 6.326 W
Width50%:

Color Coordinates

Correlated Color Temperat 3474 K
x: 0.4043 u: 0.2374 u': 0.2374
y: 0.3850 v: 0.3391 v': 0.5087

CRI01	82.5	CRI09	11.7
CRI02	90.4	CRI10	77.8
CRI03	95.7	CRI11	83.1
CRI04	82.9	CRI12	70.2
CRI05	83.0	CRI13	84.4
CRI06	87.7	CRI14	98.0
CRI07	84.2	CRI15	75.8
CRI08	63.1	CRI16	74.0
ResultsCRI	83.7		



PlandDistance 2.3E-003

4.1 Integrating Sphere Test

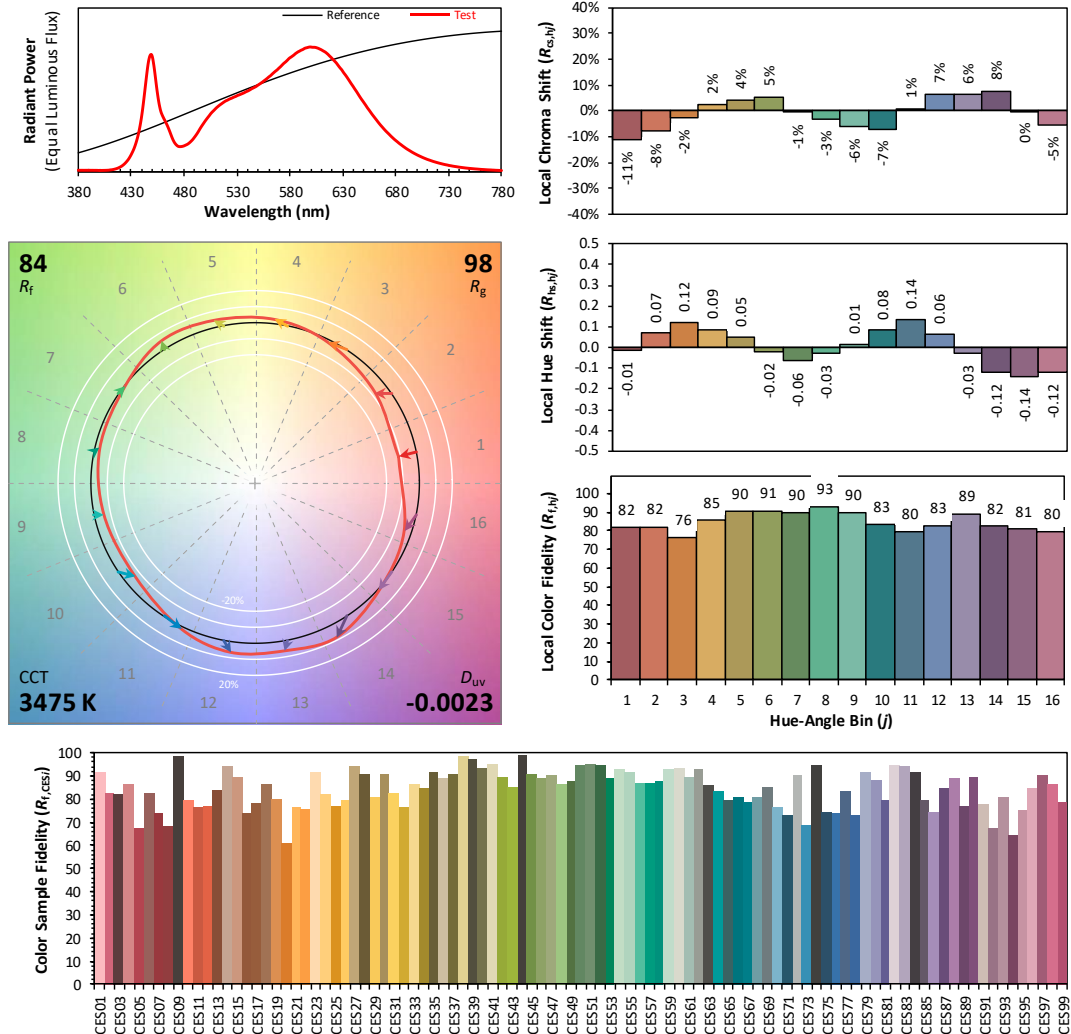
IES TM-30-18 Color Rendition Report

Source: DLF2305110-3a

Manufacturer: RAB Lighting Inc.

Date: 2023/5/23

Model: CW2/17W/3500K



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

x 0.4043
 y 0.3850
 u' 0.2374
 v' 0.5087

CIE 13.3-1995
(CRI)

R_a 85
 R_g 17

4.1 Integrating Sphere Test

Spectral Distribution over Visible Wavelength							
WL (nm)	Radiant (Watts/nm)	WL (nm)	Radiant (Watts/nm)	WL (nm)	Radiant (Watts/nm)	WL (nm)	Radiant (Watts/nm)
380	5.21E-04	485	9.04E-03	590	3.77E-02	695	6.25E-03
385	5.01E-04	490	1.09E-02	595	3.85E-02	700	5.35E-03
390	5.09E-04	495	1.34E-02	600	3.88E-02	705	4.57E-03
395	4.93E-04	500	1.59E-02	605	3.86E-02	710	3.88E-03
400	4.51E-04	505	1.80E-02	610	3.79E-02	715	3.32E-03
405	4.86E-04	510	1.98E-02	615	3.69E-02	720	2.83E-03
410	5.97E-04	515	2.11E-02	620	3.52E-02	725	2.40E-03
415	9.14E-04	520	2.22E-02	625	3.34E-02	730	2.05E-03
420	1.59E-03	525	2.29E-02	630	3.13E-02	735	1.75E-03
425	2.95E-03	530	2.37E-02	635	2.89E-02	740	1.49E-03
430	5.36E-03	535	2.44E-02	640	2.65E-02	745	1.27E-03
435	9.49E-03	540	2.51E-02	645	2.40E-02	750	1.09E-03
440	1.75E-02	545	2.61E-02	650	2.15E-02	755	9.37E-04
445	3.11E-02	550	2.70E-02	655	1.92E-02	760	8.05E-04
450	3.58E-02	555	2.82E-02	660	1.69E-02	765	6.92E-04
455	2.41E-02	560	2.95E-02	665	1.48E-02	770	5.92E-04
460	1.72E-02	565	3.09E-02	670	1.30E-02	775	5.11E-04
465	1.38E-02	570	3.24E-02	675	1.13E-02	780	4.44E-04
470	9.70E-03	575	3.40E-02	680	9.79E-03		
475	7.90E-03	580	3.55E-02	685	8.48E-03		
480	8.11E-03	585	3.67E-02	690	7.27E-03		

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	CW2/17W/3500K	Sample ID.	C1
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	277.03	60	0.066	17.5	0.951
NON-WROST CASE	120.00	60	0.143	17.1	0.996

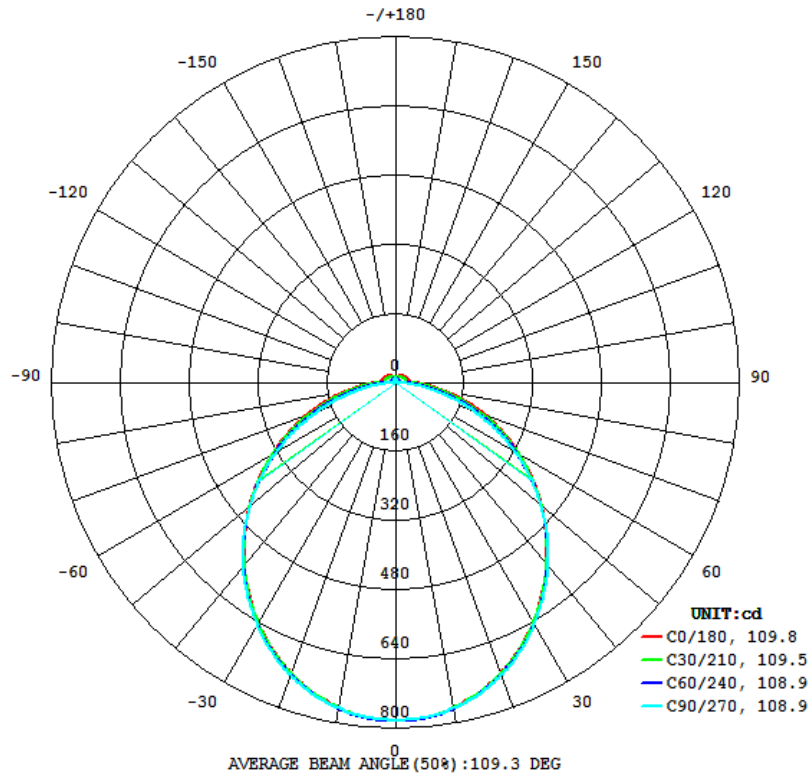
Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
2303	168.8	159.0	109.8	108.9	131.6

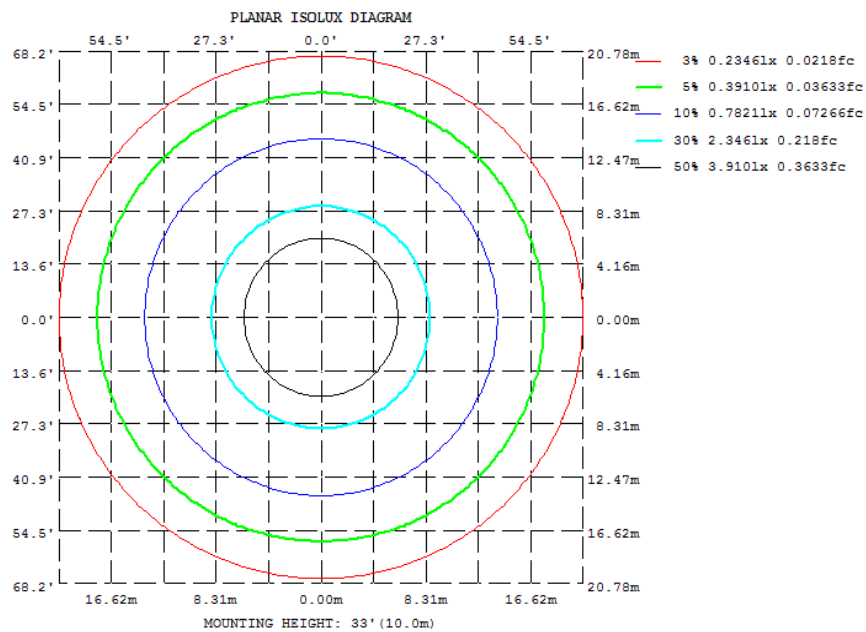
Zonal Lumen Requirement (0° - 60°)	UGR (X=4H, Y=8H, 70/50/20%)	Length(ft)	Lumen/ft
73.94%	22.8	2.00	1151

4.2 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	764.4	765.3	764.7	765.3	764.4	765.3	764.7	765.3
20	715.0	717.6	719.5	717.6	715.0	717.6	719.5	717.6
30	640.1	642.8	646.4	642.8	640.1	642.8	646.4	642.8
40	547.8	549.2	552.9	549.2	547.8	549.2	552.9	549.2
50	444.5	443.5	443.0	443.5	444.5	443.5	443.0	443.5
60	334.3	329.1	322.2	329.1	334.3	329.1	322.2	329.1
70	222.4	211.0	194.7	211.0	222.4	211.0	194.7	211.0
80	117.8	100.0	72.19	100.0	117.8	100.0	72.19	100.0
90	43.31	25.88	0.0840	25.88	43.31	25.88	0.0840	25.88
100	34.81	20.94	0.9094	20.94	34.81	20.94	0.9094	20.94
110	32.10	20.02	3.033	20.02	32.10	20.02	3.033	20.02
120	29.53	19.22	5.566	19.22	29.53	19.22	5.566	19.22
130	26.45	18.16	8.089	18.16	26.45	18.16	8.089	18.16
140	23.00	17.17	10.35	17.17	23.00	17.17	10.35	17.17
150	19.88	15.96	12.23	15.96	19.88	15.96	12.23	15.96
160	16.88	14.72	13.16	14.72	16.88	14.72	13.16	14.72
170	14.57	12.14	10.25	12.14	14.57	12.14	10.25	12.14
180	2.195	7.627	8.614	7.627	2.195	7.627	8.614	7.627
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			
		17.5	19.1	18.0	19.5	19.9	18.0	19.5	18.5	20.0
3H		19.1	20.5	19.6	20.9	21.4	19.9	21.3	20.4	21.8
4H		19.6	20.9	20.1	21.4	21.9	20.7	22.0	21.2	22.5
6H		19.9	21.1	20.4	21.6	22.1	21.4	22.6	21.9	23.1
8H		20.0	21.2	20.5	21.6	22.2	21.7	22.8	22.2	23.3
12H		20.0	21.1	20.5	21.6	22.1	21.9	23.0	22.4	23.5
4H	2H	18.2	19.5	18.7	19.9	20.4	18.6	19.9	19.0	20.3
	3H	20.0	21.1	20.5	21.6	22.1	20.7	21.8	21.2	22.3
	4H	20.6	21.6	21.1	22.1	22.7	21.6	22.6	22.1	23.1
	6H	21.0	21.9	21.5	22.4	23.0	22.4	23.3	23.0	23.8
	8H	21.1	21.9	21.6	22.4	23.0	22.8	23.6	23.3	24.1
	12H	21.1	21.9	21.7	22.4	23.0	23.1	23.8	23.6	24.4
8H	4H	20.9	21.8	21.5	22.3	22.9	21.8	22.7	22.4	23.2
	6H	21.4	22.1	22.0	22.7	23.3	22.8	23.5	23.3	24.0
	8H	21.6	22.2	22.2	22.8	23.4	23.2	23.8	23.8	24.4
	12H	21.7	22.2	22.2	22.8	23.5	23.6	24.2	24.2	24.7
12H	4H	21.0	21.7	21.6	22.3	22.9	21.8	22.6	22.4	23.1
	6H	21.6	22.2	22.2	22.7	23.4	22.8	23.4	23.4	24.0
	8H	21.7	22.3	22.3	22.9	23.5	23.3	23.8	23.8	24.4
Maximum UGR = 25.4										

4.2 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	73.84	0 - 10	73.84	3.21%
10-20	210.06	0 - 20	283.90	12.33%
20-30	314.64	0 - 30	598.54	25.99%
30-40	374.26	0 - 40	972.80	42.24%
40-50	384.10	0 - 50	1356.90	58.92%
50-60	345.73	0 - 60	1702.63	73.94%
60-70	266.35	0 - 70	1968.98	85.50%
70-80	160.75	0 - 80	2129.73	92.48%
80-90	59.68	0 - 90	2189.41	95.07%
90-100	22.67	0 - 100	2212.08	96.06%
100-110	20.34	0 - 110	2232.42	96.94%
110-120	18.56	0 - 120	2250.98	97.75%
120-130	16.22	0 - 130	2267.20	98.45%
130-140	13.37	0 - 140	2280.57	99.03%
140-150	10.24	0 - 150	2290.81	99.48%
150-160	7.10	0 - 160	2297.91	99.79%
160-170	3.91	0 - 170	2301.82	99.96%
170-180	1.01	0 - 180	2302.83	100.00%

4.2 Goniophotometer Test

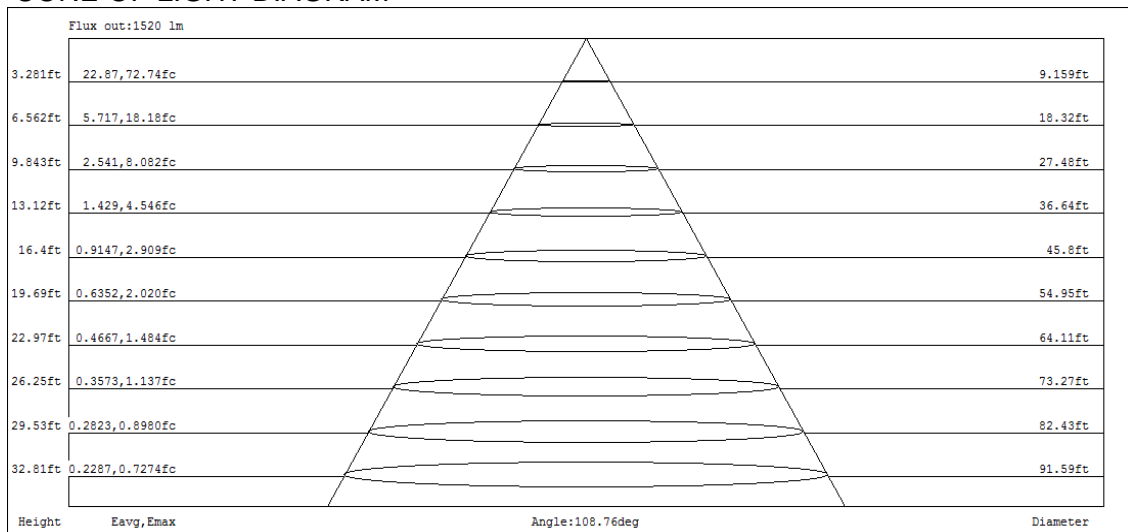
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	118	118	118	118	115	115	115	115	108	108	108	103	103	103	98	98	98	95
1	107	102	98	94	104	100	96	92	94	91	88	90	87	85	85	83	81	79
2	97	89	82	76	94	87	80	75	82	77	73	78	74	70	75	71	68	65
3	89	78	70	63	86	76	69	62	72	66	61	69	64	59	66	61	57	55
4	81	69	60	54	79	68	59	53	64	57	52	61	55	50	59	54	49	47
5	75	62	53	46	72	60	52	46	58	50	45	55	49	44	53	47	43	41
6	69	56	47	40	67	54	46	40	52	45	39	50	43	38	48	42	38	36
7	64	50	42	36	62	49	41	35	47	40	35	46	39	34	44	38	33	31
8	60	46	38	32	58	45	37	31	43	36	31	42	35	30	40	34	30	28
9	56	42	34	28	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.	CW2/17W/3500K	Sample ID.	C1
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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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
119.97	60	0.143	17.1	0.996	5.03%
277.00	60	0.066	17.5	0.951	9.65%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2022/12/24	2023/12/23
DLF108	Auxiliary Lamp	2022/12/24	2023/12/23
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-directional	2022/12/24	2023/12/23
DLF116	AC Power Source	2022/12/16	2023/12/15
DLF516	Power Meter	2022/12/16	2023/12/15
DLF112	Temperature Recorder	2022/12/28	2023/12/27
DLF114	Temperature & Humidity Datalogger	2022/12/28	2023/12/27
DLF101	Goniophotometer	2022/12/24	2023/12/23
DLF511	AC Power Source	2022/12/16	2023/12/15
DLF512	AC Power Source	2022/12/16	2023/12/15
DLF513	AC Power Source	2022/12/16	2023/12/15
DLF507	DC Power Source	2022/12/16	2023/12/15
DLF111	Temperature & Humidity Datalogger	2022/12/28	2023/12/27
DLF119	Power Meter	2022/12/16	2023/12/15
DLF031	Temperature data logger	2022/6/22	2023/6/21
DLF073	Power Analyzer	2022/6/22	2023/6/21
DLF003	Temperature & Humidity Datalogger	2022/6/22	2023/6/21

***** End of Test Report*****