

Photometric Test Report

Relevant Standards

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

Prepared For

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Report Number

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Issue Date

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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		11813
Lumen/ft (Goniophotometer - Section 4.2)	IES LM-79-2008	≥375		1477
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 115	Premium 130	128.5
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		91.9
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	6.46%
		20.00%	277V	11.94%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.997
		0.9	277V	0.987
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3985±275	4005
		4 step	3985±154	
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		13
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		95
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%		47.97%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22		23.7
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		0.768
(Goniophotometer - Section 4.2)		Non-Wrost Case		0.331
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		91.9
(Goniophotometer - Section 4.2)		Non-Wrost Case		90.5

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2022/7/27	TOMO-8/96W/4000K	K1
2	Goniophotometer Test	2022/7/27	TOMO-8/96W/4000K	K1
3	THD and PF Test	2022/7/27	TOMO-8/96W/4000K	K1

Remark(If any)

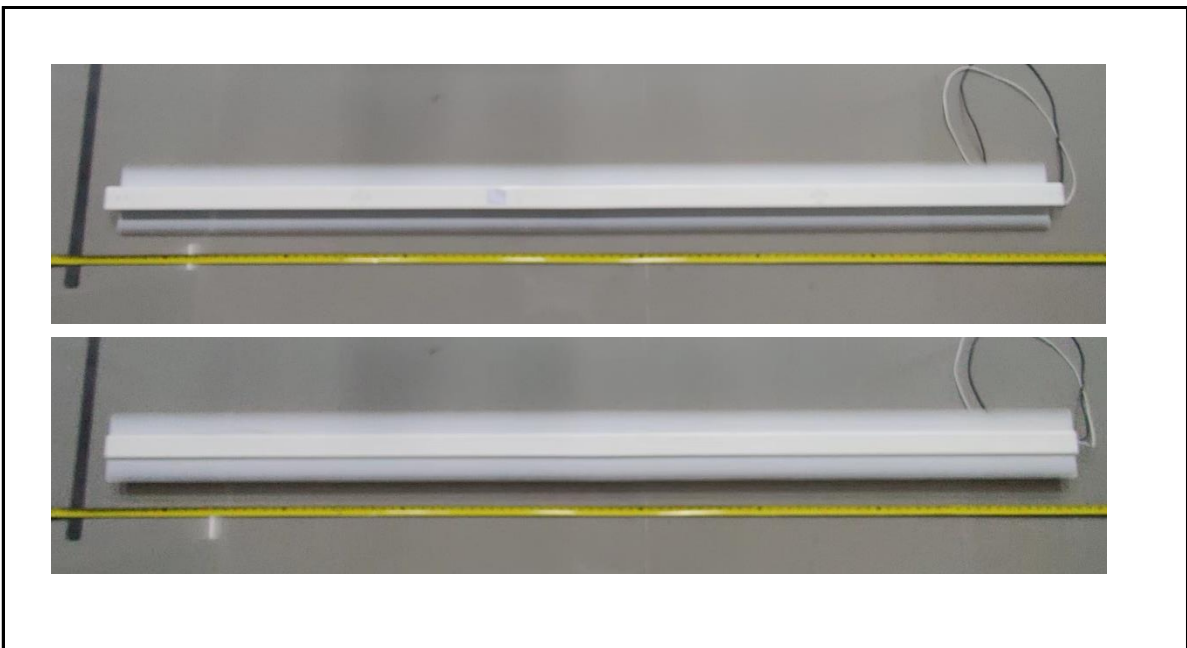
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3.0 Production Description

Luminaire Description: TOMO-8/96W/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.	TOMO-8/96W/4000K	Sample ID.	K1
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

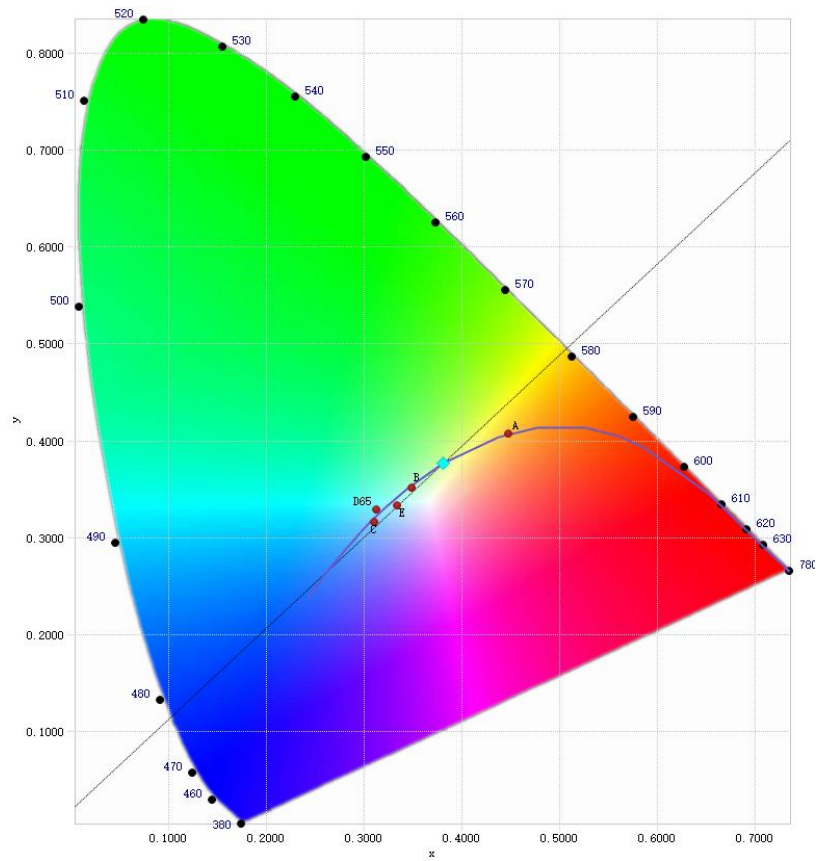
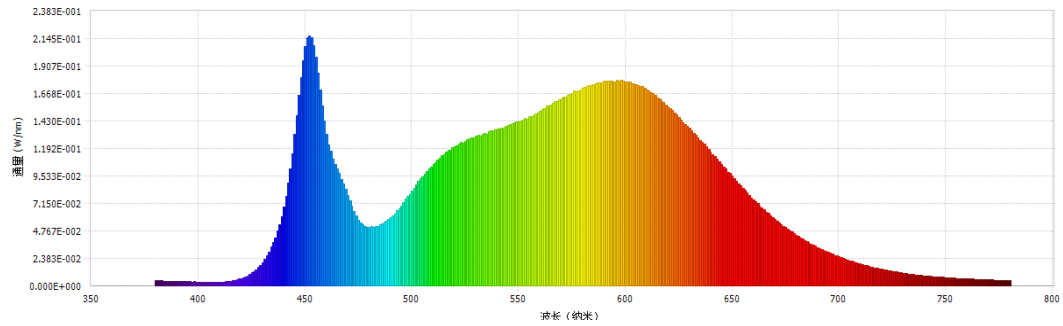
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.00	60	0.768	91.9	0.997
277.07	60	0.331	90.5	0.987

Test Result

CCT (K)	CRI	R9	Duv
4005	84	13	0.0003

Rf	Rg	IES Rcs,h1
84	95	-11%

4.1 Integrating Sphere Test



4.1 Integrating Sphere Test

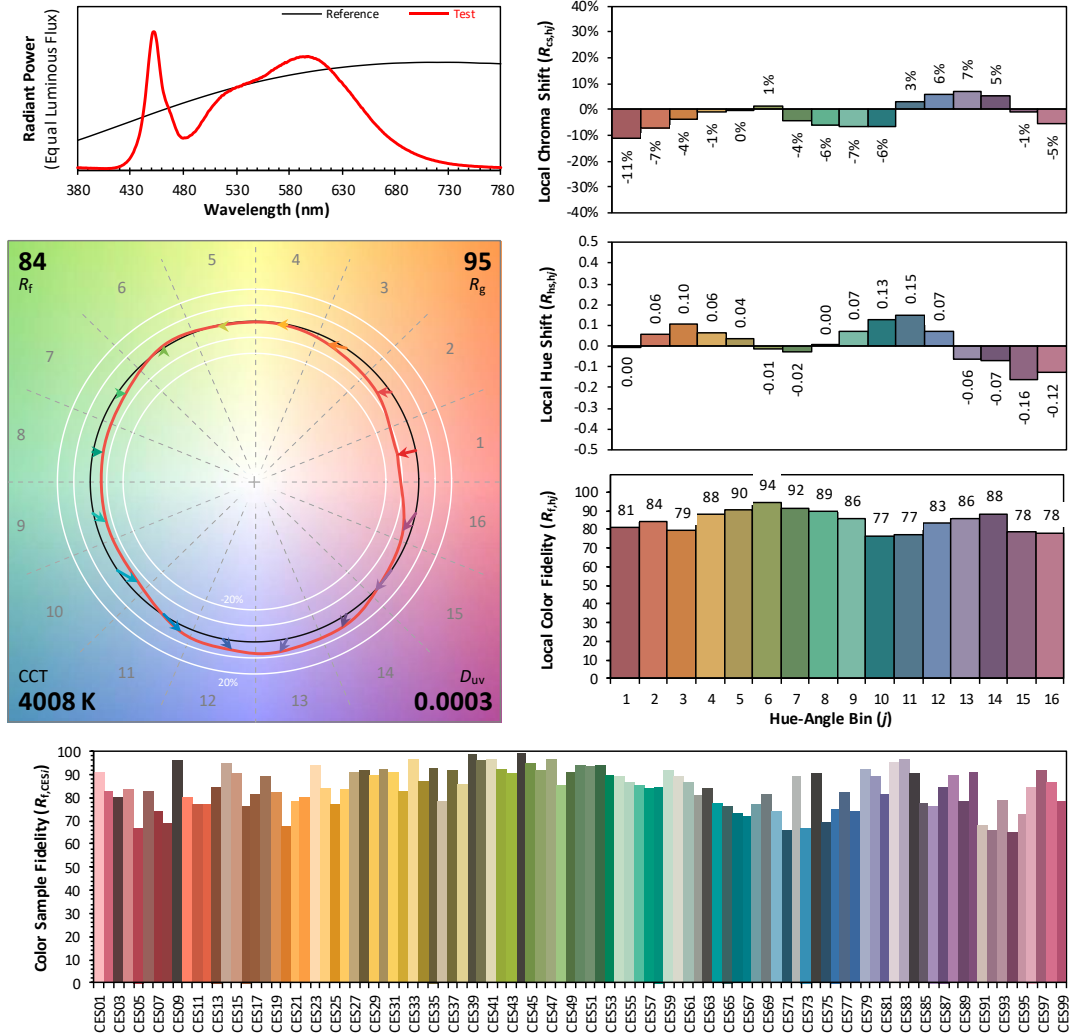
IES TM-30-18 Color Rendition Report

Source: DLF2207108-11a

Manufacturer: RAB Lighting Inc.

Date: 2022/7/27

Model: TOMO-8/96W/4000K



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

x 0.3803
 y 0.3773
 u' 0.2248
 v' 0.5018

CIE 13.3-1995
 (CRI)

R_a 84
 R_g 18

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	TOMO-8/96W/4000K	Sample ID.	K1
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° C ± 1° 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	120.00	60	0.768	91.9	0.997
NON-WROST CASE	277.07	60	0.331	90.5	0.987

Test Result

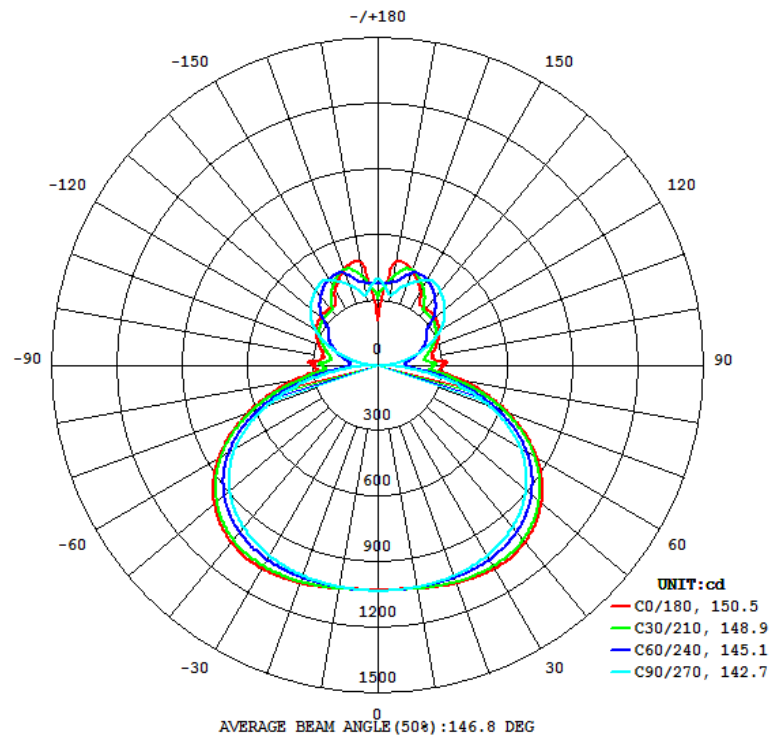
4FT light output in Sphere	6164	Scale Factor	1.84207709
8FT light output in Sphere	11355	4FT Gonio Light output	6413

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
11813	360.0	360.0	150.5	142.7	128.5

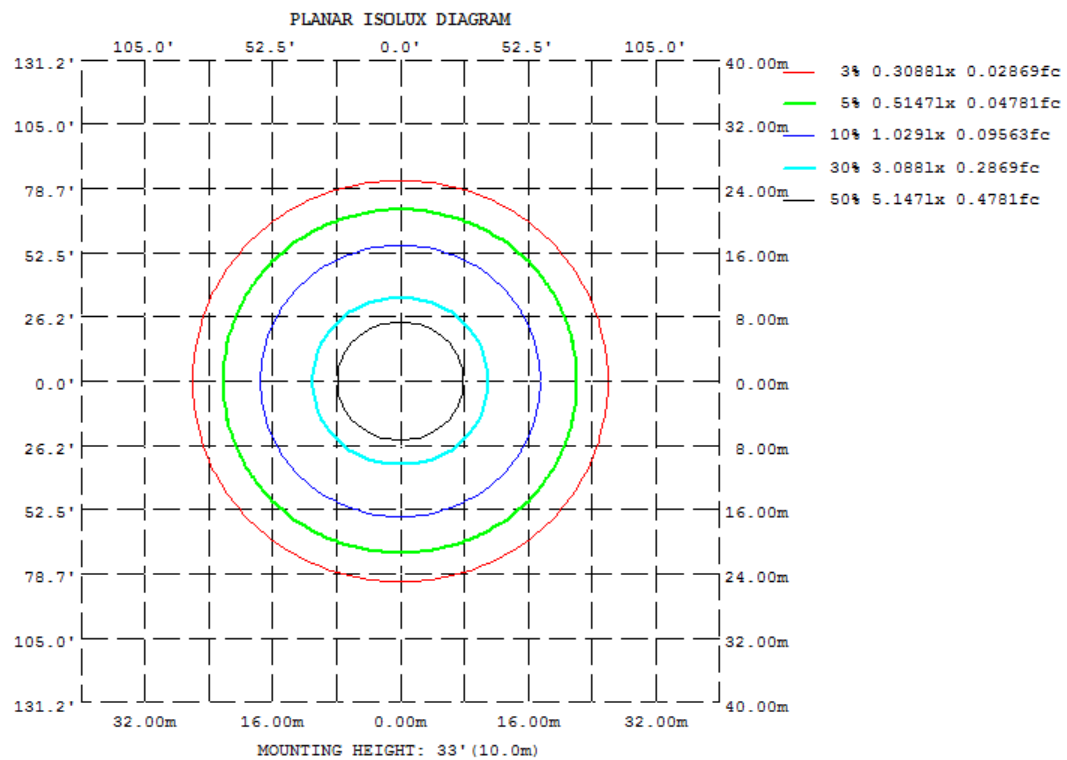
Zonal Lumen Requirement (0°-60°)	UGR (X=4H, Y=8H, 70/50/20%)	Length(ft)	Lumen/ft
47.97%	23.7	8.00	1477

4.2 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.2 Goniophotometer Test

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					
	16.8	18.0	17.5	18.8	19.7	17.4	18.6	18.1	19.3	20.3	
3H	19.1	20.2	19.8	21.0	21.9	19.8	20.9	20.6	21.7	22.6	
4H	20.0	21.0	20.8	21.8	22.8	20.9	21.9	21.6	22.7	23.7	
6H	20.7	21.7	21.5	22.5	23.4	21.9	22.8	22.7	23.6	24.6	
8H	20.9	21.8	21.7	22.7	23.7	22.3	23.2	23.1	24.1	25.0	
12H	21.1	21.9	21.9	22.8	23.8	22.8	23.7	23.6	24.5	25.5	
4H 2H	17.7	18.7	18.4	19.5	20.5	18.1	19.1	18.9	19.9	20.9	
3H	20.2	21.0	21.0	21.9	22.9	20.8	21.6	21.6	22.5	23.5	
4H	21.2	22.0	22.0	22.8	23.9	22.0	22.8	22.8	23.6	24.6	
6H	22.0	22.7	22.8	23.6	24.6	23.1	23.9	24.0	24.7	25.7	
8H	22.3	23.0	23.1	23.8	24.9	23.7	24.3	24.5	25.2	26.2	
12H	22.5	23.1	23.3	24.0	25.0	24.2	24.9	25.1	25.7	26.8	
8H 4H	21.7	22.4	22.5	23.2	24.3	22.4	23.1	23.2	23.9	24.9	
6H	22.7	23.3	23.6	24.2	25.2	23.7	24.3	24.6	25.2	26.2	
8H	23.1	23.6	24.0	24.5	25.6	24.4	24.9	25.3	25.8	26.8	
12H	23.4	23.9	24.3	24.7	25.8	25.2	25.6	26.0	26.5	27.6	
12H 4H	21.8	22.4	22.7	23.3	24.3	22.4	23.0	23.3	23.9	24.9	
6H	22.9	23.4	23.8	24.3	25.4	23.8	24.3	24.7	25.2	26.3	
8H	23.4	23.8	24.2	24.7	25.8	24.6	25.0	25.5	25.9	27.0	

Maximum UGR = 27.6

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	181.55	0 - 10	181.55	1.54%
10-20	542.78	0 - 20	724.33	6.13%
20-30	889.83	0 - 30	1614.16	13.66%
30-40	1193.06	0 - 40	2807.22	23.76%
40-50	1402.16	0 - 50	4209.38	35.63%
50-60	1458.02	0 - 60	5667.40	47.97%
60-70	1300.99	0 - 70	6968.39	58.99%
70-80	916.60	0 - 80	7884.99	66.75%
80-90	456.22	0 - 90	8341.21	70.61%
90-100	360.36	0 - 100	8701.57	73.66%
100-110	408.74	0 - 110	9110.31	77.12%
110-120	499.90	0 - 120	9610.21	81.35%
120-130	539.97	0 - 130	10150.18	85.92%
130-140	520.94	0 - 140	10671.12	90.33%
140-150	470.98	0 - 150	11142.10	94.32%
150-160	379.16	0 - 160	11521.26	97.53%
160-170	225.58	0 - 170	11746.84	99.44%
170-180	66.57	0 - 180	11813.41	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	112	112	112	112	106	106	106	106	95	95	95	84	84	84	75	75	75	71
1	100	95	90	86	95	90	86	82	80	77	74	71	69	66	63	61	59	55
2	90	81	74	68	85	77	70	65	69	63	59	61	57	53	54	51	48	44
3	82	70	62	55	77	67	59	53	59	53	48	53	48	44	47	43	39	36
4	74	62	53	46	69	58	50	44	52	45	40	46	41	36	41	37	33	30
5	68	55	45	39	63	52	43	37	46	39	34	41	35	31	36	32	28	25
6	62	49	40	33	58	46	38	32	41	34	29	37	31	27	33	28	24	21
7	57	44	35	29	54	41	33	27	37	30	25	33	27	23	30	25	21	19
8	53	39	31	25	50	38	30	24	34	27	22	30	25	20	27	22	19	16
9	49	36	28	22	46	34	27	21	31	24	20	28	22	18	25	20	17	14
10	46	33	25	20	43	31	24	19	28	22	18	26	20	16	23	18	15	13

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	TOMO-8/96W/4000K	Sample ID.	K1
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
120.00	60	0.768	91.9	0.997	6.46%
277.07	60	0.331	90.5	0.987	11.94%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2021/12/26	2022/12/25
DLF108	Auxiliary Lamp	2021/12/26	2022/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2021/12/26	2022/12/25
DLF116	AC Power Source	2021/12/26	2022/12/25
DLF113	Power Meter	2021/12/26	2022/12/25
DLF112	Temperature Recorder	2021/12/26	2022/12/25
DLF114	Temperature & Humidity Datalogger	2021/12/26	2022/12/25
DLF101	Goniophotometer	2021/12/26	2022/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2021/12/26	2022/12/25
DLF104	AC Power Source	2021/12/26	2022/12/25
DLF507	DC Power Source	2021/12/26	2022/12/25
DLF102	Power Meter	2021/12/26	2022/12/25
DLF111	Temperature & Humidity Datalogger	2021/12/26	2022/12/25
DLF119	Power Meter	2021/12/26	2022/12/25
DLF031	Temperature data logger	2021/12/26	2022/12/25
DLF022	Digital power meter	2021/12/26	2022/12/25
DLF003	Temperature & Humidity Datalogger	2021/12/26	2022/12/25

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