

Photometric Test Report

Relevant Standards

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

Prepared For RAB Lighting Inc.

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Test Date

2022/11/16

Issue Date

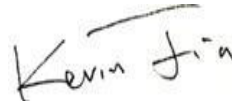
2022/11/17

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

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1.0 Test Summary

DLC Technical Requirements v5.1

Indoor - Troffer - 2x4 Luminaires for Ambient Lighting of Interior Commercial Spaces				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	3000		2398
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 110	Premium 125	134.0
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		17.9
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	6.94%
		20.00%	277V	7.41%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.993
		0.9	277V	0.918
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	5029±355	4893
		4 step	5029±220	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥80		81
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥0		6
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		82
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		97
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	≥75%		76.49%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22		17.6
SC: 0-180° (Goniophotometer - Section 4.2)	IES LM-79-2008	1.0-2.0		1.34
SC: 90-270° (Goniophotometer - Section 4.2)	IES LM-79-2008	1.0-2.0		1.28
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		277
(Goniophotometer - Section 4.2)		Non-Worst Case		120
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		0.071
(Goniophotometer - Section 4.2)		Non-Worst Case		0.144
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		17.9
(Goniophotometer - Section 4.2)		Non-Worst Case		17.0

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2022/11/16	T34FAHE2X4/17W/5000K	L1
2	Goniophotometer Test	2022/11/16	T34FAHE2X4/17W/5000K	L1
3	THD and PF Test	2022/11/16	T34FAHE2X4/17W/5000K	L1

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: T34FAHE2X4/17W/5000K

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.	T34FAHE2X4/17W/500 0K	Sample ID.	L1
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
119.99	60	0.141	16.8	0.993
277.01	60	0.070	17.7	0.918

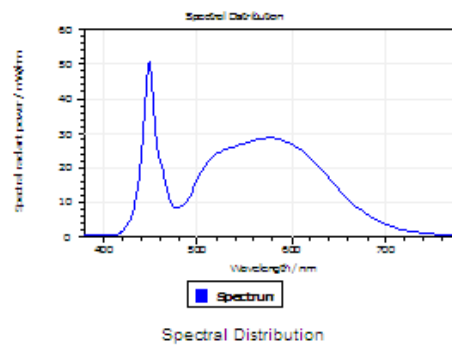
Test Result

CCT (K)	CRI	R9	Duv
4893	81	6	0.0041

Rf	Rg	IES Rcs,h1
82	97	-12%

4.1 Integrating Sphere Test

Results



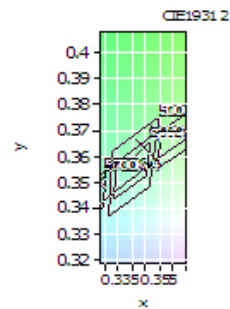
Spectral values

DominantWavelength 570.66 nm
Purity 0.137
PeakWavelength 448.79 nm
Radiant Power 5.572 W
Width50%:

Color Coordinates

Correlated Color Temperat 4893 K
x: 0.3491 u: 0.2097 u': 0.2097
y: 0.3631 v: 0.3272 v': 0.4908

CRI01	78.5	CRI09	5.5
CRI02	84.6	CRI10	64.1
CRI03	89.6	CRI11	80.0
CRI04	81.4	CRI12	52.8
CRI05	79.1	CRI13	79.7
CRI06	79.1	CRI14	94.4
CRI07	87.9	CRI15	72.6
CRI08	67.6	CRI16	71.8
ResultsCRI	81.0		



PlanckDistance 4.1E-003

4.1 Integrating Sphere Test

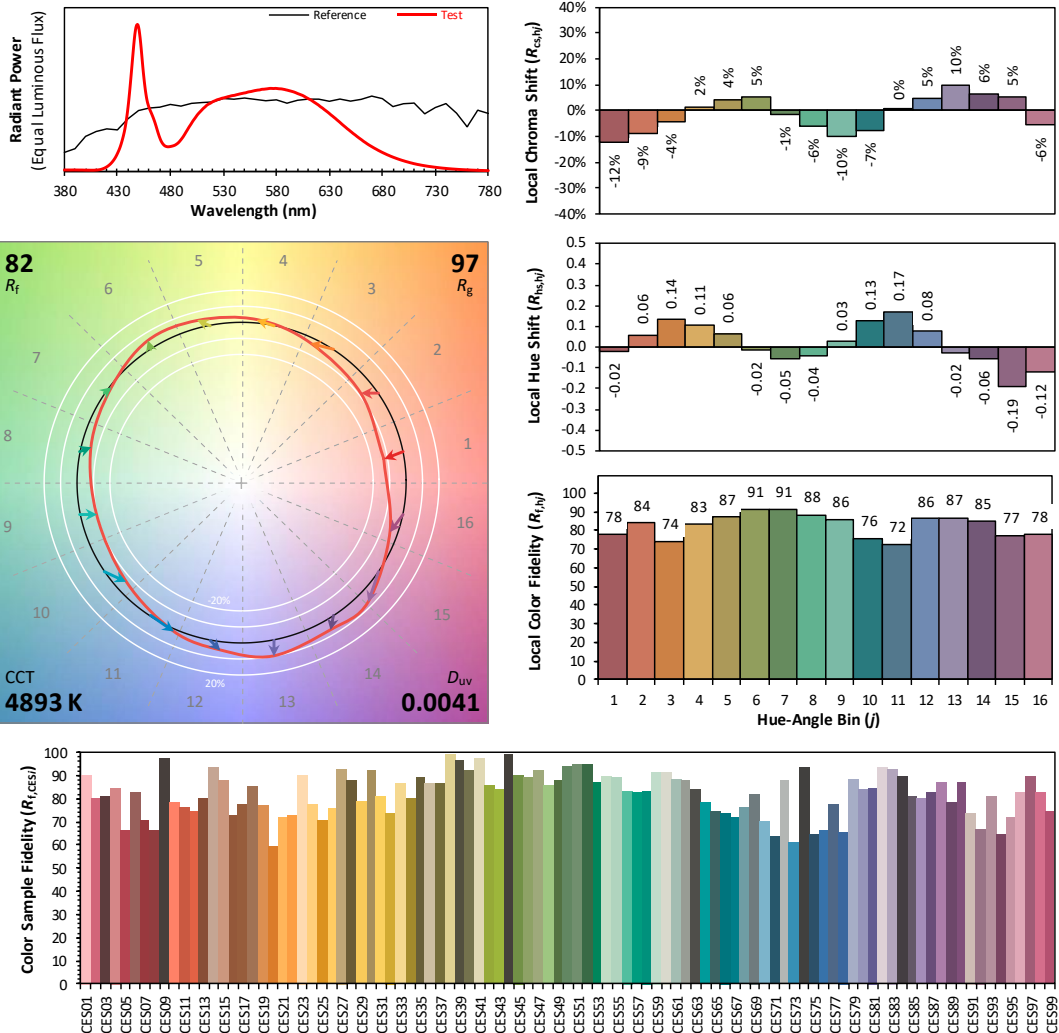
IES TM-30-18 Color Rendition Report

Source: DLF2211103-12a

Manufacturer: RAB Lighting Inc.

Date: 2022/11/16

Model: T34FAHE2X4/17W/5000K



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

x 0.3491
 y 0.3631
 u' 0.2097
 v' 0.4908

CIE 13.3-1995
(CRI)

R_a 82
 R_9 12

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	T34FAHE2X4/17W/5000K	Sample ID.	L1
Operate 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 parameters 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	277.00	60	0.071	17.9	0.911
NON-WROST CASE	120.01	60	0.144	17.0	0.986

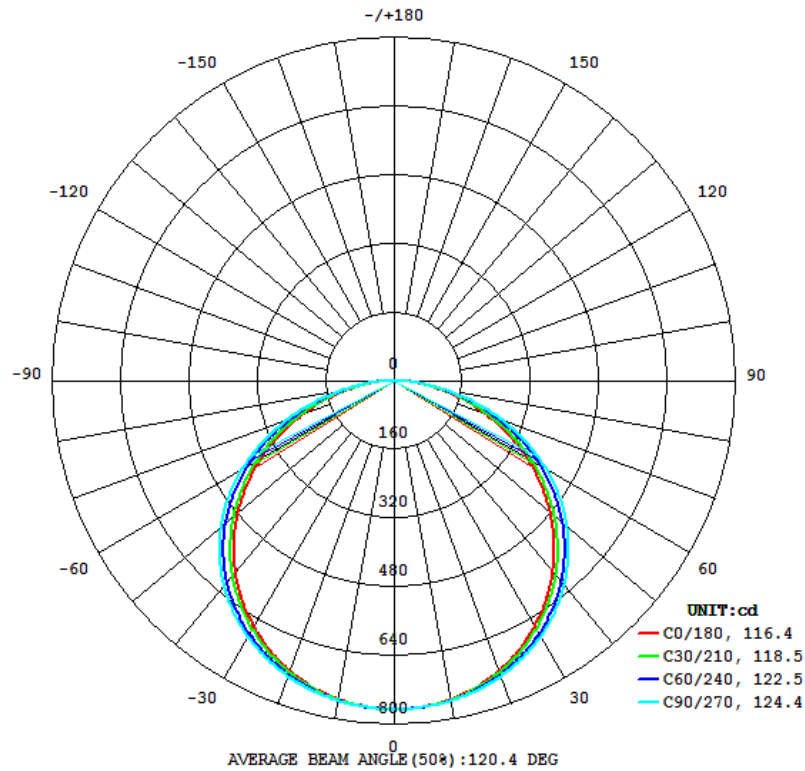
Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
2398	164.8	166.0	116.4	124.4	134.0

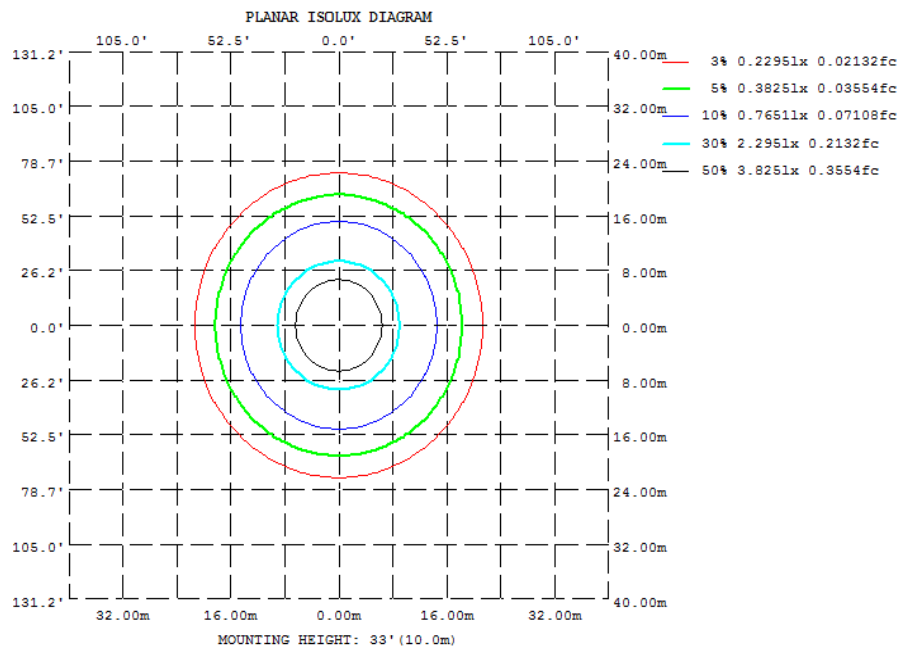
Zonal Lumen Requirement (0° - 60°)	UGR (X=4H, Y=8H, 70/50/20%)	SC: 0 - 180°	SC: 90 - 270°
76.49%	17.6	1.34	1.28

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	753.4	755.2	756.8	755.2	753.4	755.2	756.8	755.2
20	718.3	724.5	731.2	724.5	718.3	724.5	731.2	724.5
30	660.3	673.2	686.8	673.2	660.3	673.2	686.8	673.2
40	579.4	599.7	620.7	599.7	579.4	599.7	620.7	599.7
50	478.8	503.7	530.0	503.7	478.8	503.7	530.0	503.7
60	360.5	385.3	412.0	385.3	360.5	385.3	412.0	385.3
70	231.9	250.2	270.2	250.2	231.9	250.2	270.2	250.2
80	104.7	112.8	118.8	112.8	104.7	112.8	118.8	112.8
90	4.357	4.251	2.730	4.251	4.357	4.251	2.730	4.251
100	0.1543	0.1584	0.1522	0.1584	0.1543	0.1584	0.1522	0.1584
110	0.2316	0.2238	0.2060	0.2238	0.2316	0.2238	0.2060	0.2238
120	0.2137	0.2363	0.2272	0.2363	0.2137	0.2363	0.2272	0.2363
130	0.2815	0.2931	0.3017	0.2931	0.2815	0.2931	0.3017	0.2931
140	0.3438	0.3465	0.3447	0.3465	0.3438	0.3465	0.3447	0.3465
150	0.3543	0.3739	0.3555	0.3739	0.3543	0.3739	0.3555	0.3739
160	0.3658	0.3714	0.3751	0.3714	0.3658	0.3714	0.3751	0.3714
170	0.3447	0.3386	0.3508	0.3386	0.3447	0.3386	0.3508	0.3386
180	0.3809	0.3572	0.3599	0.3572	0.3809	0.3572	0.3599	0.3572
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	12.9	14.5	13.2	14.9	15.2	12.2	13.9	12.5	14.2	14.5
	3H	14.9	16.4	15.3	16.7	17.1	14.1	15.6	14.4	15.9	16.3
	4H	15.6	17.1	16.0	17.4	17.8	14.8	16.2	15.2	16.6	17.0
	6H	16.2	17.6	16.6	17.9	18.3	15.4	16.7	15.8	17.1	17.5
	8H	16.4	17.7	16.8	18.1	18.5	15.5	16.8	16.0	17.2	17.6
	12H	16.5	17.8	17.0	18.1	18.6	15.7	16.9	16.1	17.3	17.7
4H	2H	13.5	14.9	13.9	15.3	15.6	12.9	14.4	13.3	14.7	15.1
	3H	15.7	16.9	16.1	17.3	17.7	15.1	16.3	15.5	16.7	17.1
	4H	16.6	17.7	17.1	18.1	18.6	15.9	17.0	16.3	17.4	17.9
	6H	17.3	18.3	17.8	18.7	19.2	16.6	17.6	17.0	18.0	18.5
	8H	17.6	18.5	18.1	18.9	19.4	16.9	17.8	17.3	18.2	18.7
	12H	17.8	18.6	18.2	19.1	19.5	17.0	17.8	17.5	18.3	18.8
8H	4H	16.9	17.8	17.4	18.3	18.7	16.3	17.2	16.8	17.7	18.1
	6H	17.8	18.5	18.3	19.0	19.5	17.2	17.9	17.6	18.4	18.9
	8H	18.1	18.8	18.6	19.3	19.8	17.5	18.1	18.0	18.6	19.1
	12H	18.4	19.0	18.9	19.5	20.0	17.7	18.3	18.2	18.8	19.4
12H	4H	17.0	17.8	17.5	18.3	18.7	16.4	17.2	16.9	17.7	18.1
	6H	17.9	18.5	18.4	19.0	19.5	17.2	17.9	17.8	18.4	18.9
	8H	18.2	18.8	18.7	19.3	19.9	17.6	18.2	18.1	18.7	19.3

Maximum UGR = 20.0

4.2 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	72.58	0 - 10	72.58	3.03%
10-20	209.80	0 - 20	282.38	11.78%
20-30	323.69	0 - 30	606.07	25.28%
30-40	400.18	0 - 40	1006.25	41.97%
40-50	427.90	0 - 50	1434.15	59.82%
50-60	399.76	0 - 60	1833.91	76.49%
60-70	316.20	0 - 70	2150.11	89.68%
70-80	190.88	0 - 80	2340.99	97.64%
80-90	56.59	0 - 90	2397.58	100.00%
90-100	0.00	0 - 100	2397.58	100.00%
100-110	0.00	0 - 110	2397.58	100.00%
110-120	0.00	0 - 120	2397.58	100.00%
120-130	0.00	0 - 130	2397.58	100.00%
130-140	0.00	0 - 140	2397.58	100.00%
140-150	0.00	0 - 150	2397.58	100.00%
150-160	0.00	0 - 160	2397.58	100.00%
160-170	0.00	0 - 170	2397.58	100.00%
170-180	0.00	0 - 180	2397.58	100.00%

4.2 Goniophotometer Test

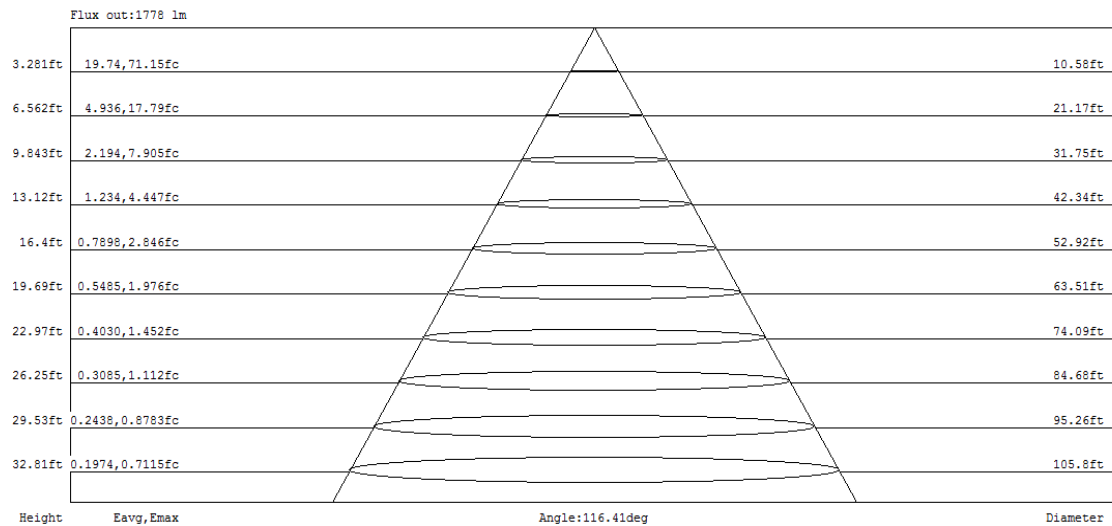
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	108	103	99	95	105	101	97	93	97	93	90	93	90	87	89	87	85	83
2	98	89	82	76	95	87	81	75	84	78	74	81	76	72	77	74	70	68
3	89	78	70	63	86	76	69	62	73	67	61	71	65	60	68	63	59	57
4	81	69	60	53	79	68	59	52	65	58	52	63	56	51	60	55	50	48
5	75	61	52	45	72	60	51	45	58	50	44	56	49	44	54	48	43	41
6	69	55	46	39	67	54	45	39	52	45	39	51	44	38	49	43	38	36
7	64	50	41	35	62	49	40	34	47	40	34	46	39	34	45	38	34	32
8	59	45	37	31	58	45	36	31	43	36	30	42	35	30	41	35	30	28
9	55	42	33	28	54	41	33	27	40	32	27	39	32	27	38	32	27	25
10	52	38	30	25	50	38	30	25	37	30	25	36	29	25	35	29	24	23

CONE OF LIGHT DIAGRAM



4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	T34FAHE2X4/17W/5000K	Sample ID.	L1
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
119.99	60	0.141	16.8	0.993	6.94%
277.01	60	0.070	17.7	0.918	7.41%

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*****