



Photometric Test Report

Relevant Standards

- IES LM-79-2024
- ANSI C82.77-10:2020

Prepared For

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Project Number

DLF2602104

Report Number

DLF2602104-1a

Test Date

2026/2/5

Issue Date

2026/2/6

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Approved By

Kevin Jia

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The results contained in this report pertain only to the tested sample.

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1.0 Test Summary

DLC Technical Requirements v6.0

Linear Replacement Lamps - 4' T8 Lamps- 1-lamp External Driver (UL Type C) Lamp				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2024	1600		2536
Minimum Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2024	130		143.3
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2024	Wrost Case		17.7
Beam Angle (°) (Goniophotometer - Section 4.2)	IES LM-79-2024	≥140		182.9
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77-10: 2020	20.00%	120V	6.02%
		20.00%	277V	12.93%
Power Factor (THD & PF - section 4.3)	ANSI C82.77-10: 2020	0.9	120V	0.994
		0.9	277V	0.930
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2024	7 step	3045±175	3053
		4 step	3045±100	
Chromaticity (Duv) (Integrating Sphere - Section 4.1)	IES LM-79-2024	7 step	0.0001±0.0060	0.00057
		4 step	0.0001±0.0033	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2024 CIE 13.3-1995	≥80		83
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2024 CIE 13.3-1995	≥0		6
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-24	≥70		85
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-24	≥89		95
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-24	-12%≤IES Rcs,h1≤+23%		-11%
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2024	Worst Case		277
(Goniophotometer - Section 4.2)		Non-Worst Case		120
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2024	Worst Case		0.069
(Goniophotometer - Section 4.2)		Non-Worst Case		0.143
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2024	Worst Case		17.7
(Goniophotometer - Section 4.2)		Non-Worst Case		17.1

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2026/2/5	L48T8/830/15P-XT (1H)	DLF2602104-A1
			L48T8/850/15P-XT (1H)	DLF2602104-A2
2	Goniophotometer Test	2026/2/5	L48T8/830/15P-XT (1H)	DLF2602104-A1
3	THD and PF Test	2026/2/5	L48T8/830/15P-XT (1H)	DLF2602104-A1
			L48T8/850/15P-XT (1H)	DLF2602104-A2

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 DUT Description

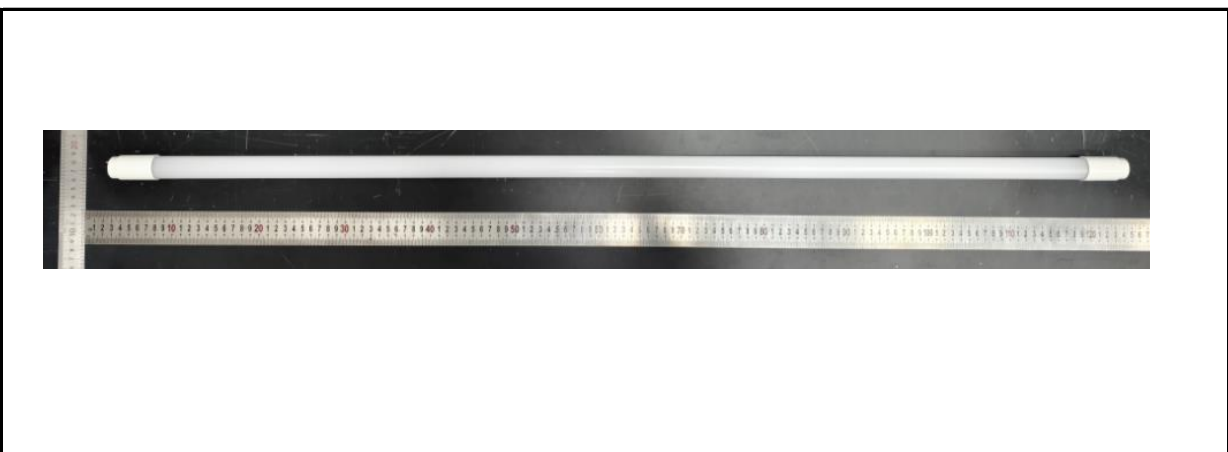
Model Number: L48T8/830/15P-XT (1H)

Electrical Rating: 120-277V,50/60Hz

Received Date: 2026/2/5

External Driver Model: VPL50-2C

Photos of DUT Characteristics



4.0 Test Results

4.1 Integrating Sphere Test - 3000K

Model No.	L48T8/830/15P-XT (1H)	Sample ID.	DLF2602104-A1
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-79-2024.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature and relative humidity condition inside the sphere was maintained at 25° C ± 1.2° C and 10% - 65% RH.

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
120.06	60	0.145	17.3	0.994
277.01	60	0.069	17.9	0.930

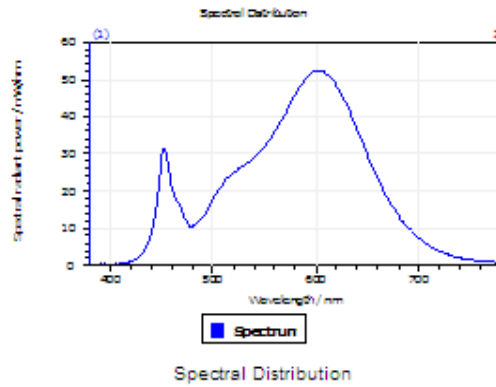
Test Result

CCT (K)	CRI	R9	Duv
3053	83	6	0.00057

Rf	Rg	IES Rcs,h1	Light Output (lm)	Luminous Efficacy (lm/W)
85	95	-11%	2583	144.3

4.1 Integrating Sphere Test

Results



Spectral values

DominantWavelength 582.40 nm
Purity 0.517
PeakWavelength 602.83 nm
Radiant Power 7.779 W

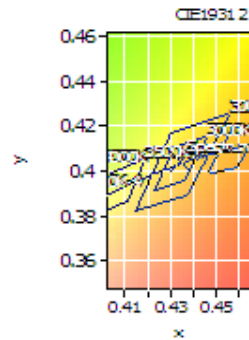
Width50%:

Color Coordinates

Correlated Color Temperat 3053 K
x: 0.4340 u: 0.2485 u': 0.2485
y: 0.4045 v: 0.3474 v': 0.5211

CRI01	81.5	CRI09	6.4
CRI02	91.8	CRI10	81.5
CRI03	95.6	CRI11	80.3
CRI04	80.5	CRI12	70.5
CRI05	81.6	CRI13	84.1
CRI06	90.2	CRI14	98.2
CRI07	82.5	CRI15	73.5
CRI08	58.7	CRI16	70.5

ResultsCRI 82.8



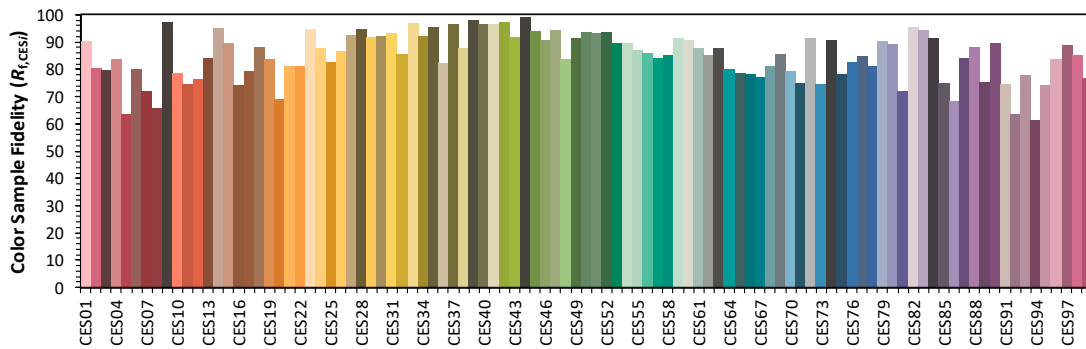
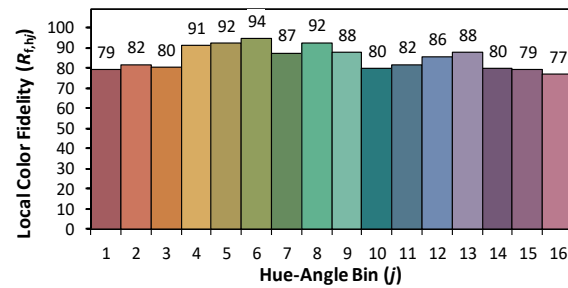
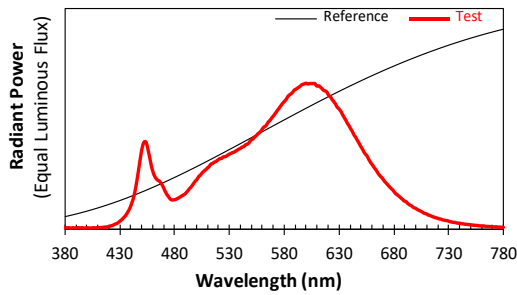
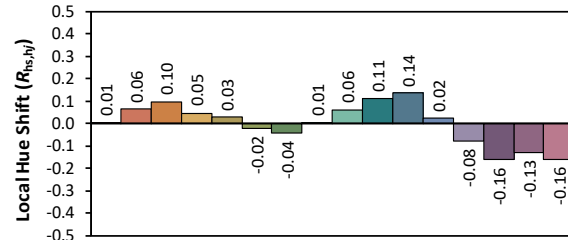
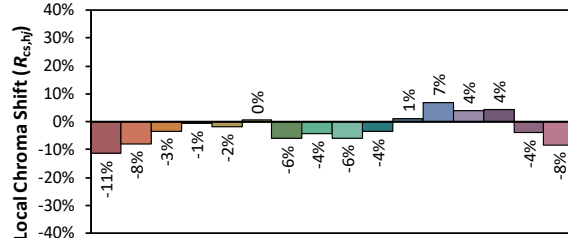
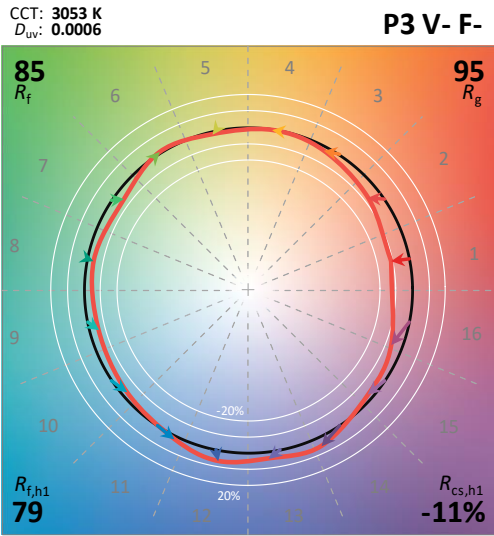
PlanckDistance 5.7E-004

4.1 Integrating Sphere Test

ANSI/IES TM-30-24 Color Rendition Report

Source: DLF2602104-1a
Date: 2026/2/5
Note: N/A

Make: Espen Technology Inc.
Model: L48T8/830/15P-XT (1H)
Other: N/A



4.0 Test Results

4.1 Integrating Sphere Test - 5000K

Model No.	L48T8/850/15P-XT (1H)	Sample ID.	DLF2602104-A2
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-79-2024.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature and relative humidity condition inside the sphere was maintained at 25° C ± 1.2° C and 10% - 65% RH.

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
120.08	60	0.144	17.2	0.994
277.06	60	0.069	17.8	0.929

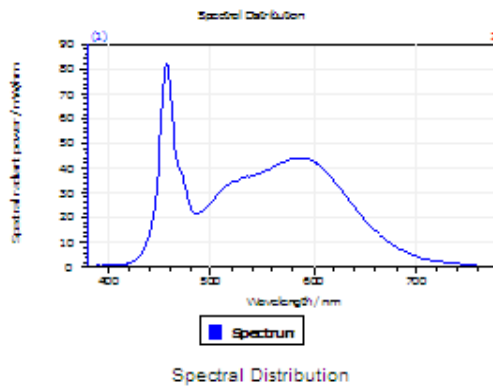
Test Result

CCT (K)	CRI	R9	Duv
5043	83	6	0.0023

Rf	Rg	IES Rcs,h1	Light Output (lm)	Luminous Efficacy (lm/W)
82	92	-13%	2714	152.5

4.1 Integrating Sphere Test

Results



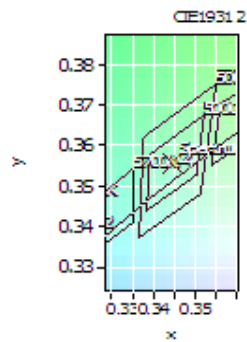
Spectral values

DominantWavelength 569.89 nm
Purity 0.100
PeakWavelength 457.04 nm
Radiant Power 8.442 W
Width50%:

Color Coordinates

Correlated Color Temperat 5043 K
x: 0.3443 u: 0.2094 u': 0.2094
y: 0.3556 v: 0.3243 v': 0.4865

CRI01	82.7	CRI09	5.9
CRI02	93.9	CRI10	84.3
CRI03	93.5	CRI11	78.3
CRI04	78.6	CRI12	61.7
CRI05	82.5	CRI13	86.7
CRI06	89.3	CRI14	97.1
CRI07	82.8	CRI15	76.4
CRI08	63.1	CRI16	71.0
ResultsCRI	83.3		



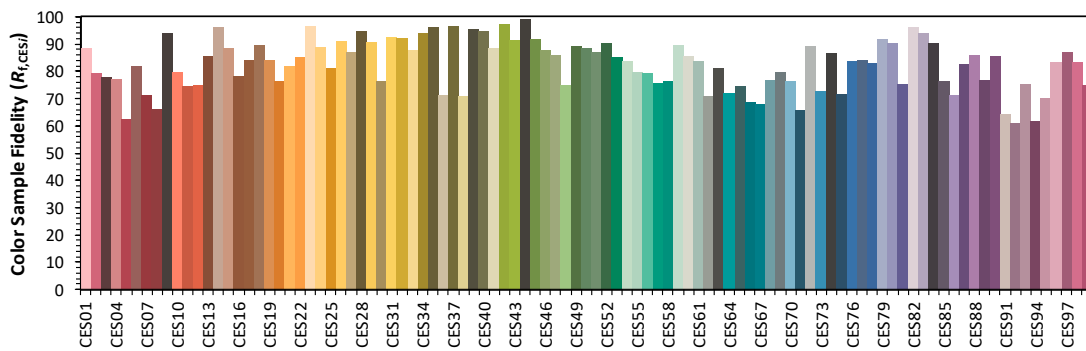
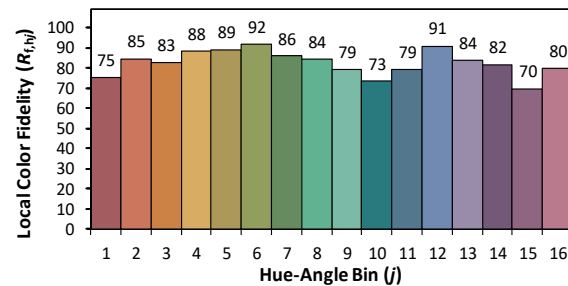
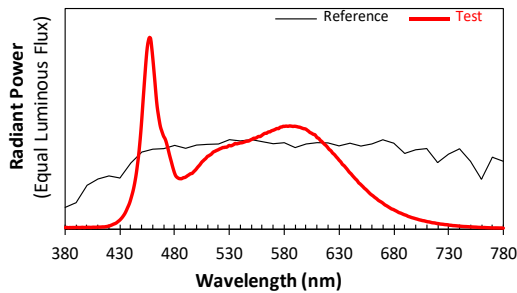
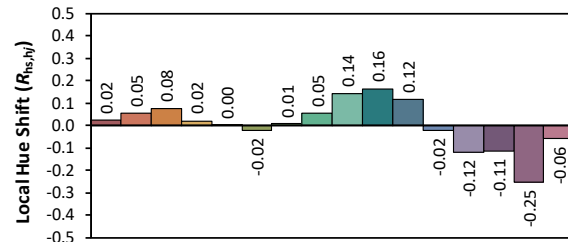
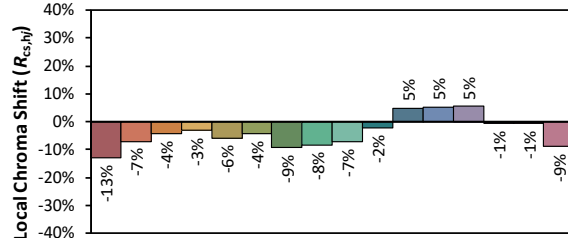
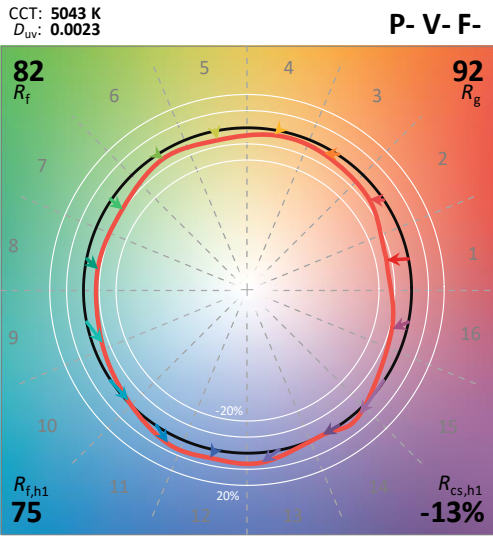
PlanckDistance 2.3E-003

4.1 Integrating Sphere Test

ANSI/IES TM-30-24 Color Rendition Report

Source: DLF2602104-1a
Date: 2026/2/5
Note: N/A

Make: Espen Technology Inc.
Model: L48T8/850/15P-XT (1H)
Other: N/A



4.0 Test Results

4.2 Goniophotometer Test - 3000K

Model No.	L48T8/830/15P-XT (1H)	Sample ID.	DLF2602104-A1
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-79-2024.

Photometric parameters were measured using a type C goniophotometer and software.

The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1.2^{\circ}\text{C}$ and 10% - 65% RH, 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.

Airflow for the instantaneous tangential velocity of any point on the DUT shall be less than an upper tolerance limit of 0.20 m/s.

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

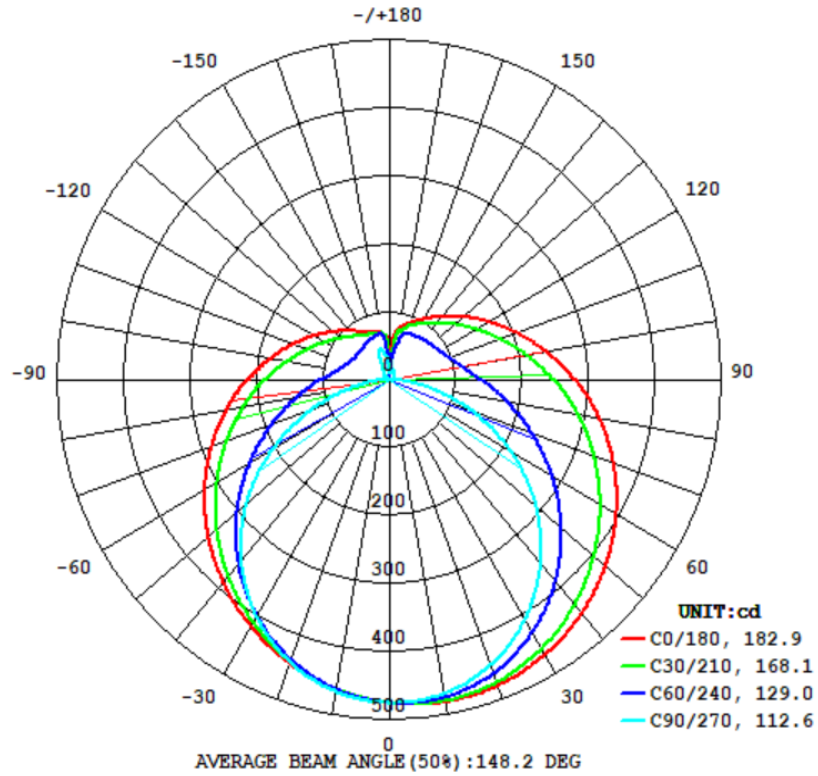
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	277.00	60	0.069	17.7	0.930
NON-WORST CASE	120.02	60	0.143	17.1	0.994

Test Result

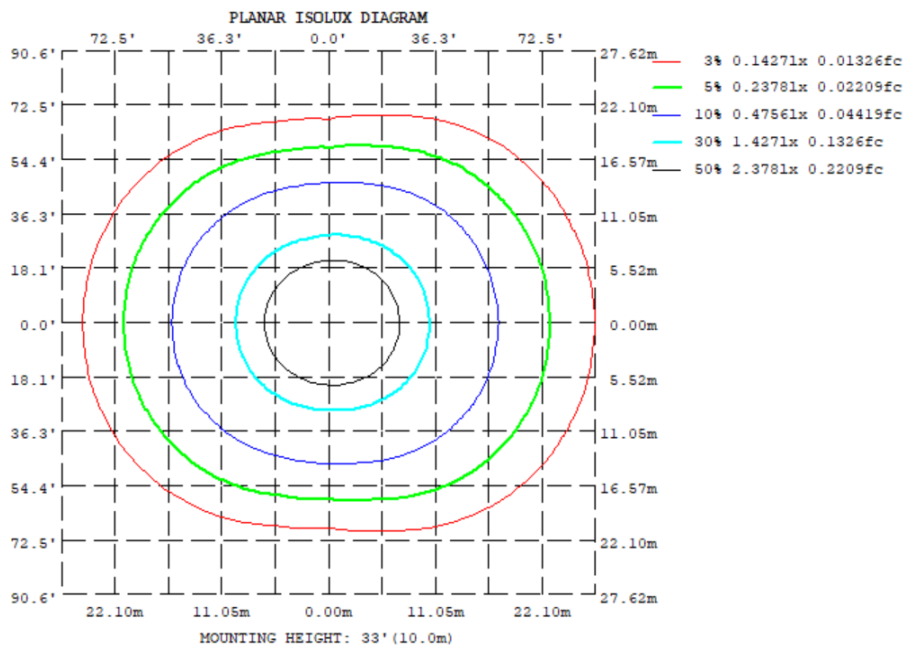
Flux (lm)	Luminous Efficacy (lm/W)	Beam Angle
2536	143.3	182.9

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	480.8	476.5	468.4	463.9	462.5	462.0	465.8	474.8
20	478.0	466.2	445.9	442.0	443.5	438.4	441.3	463.0
30	467.2	444.2	408.0	410.5	418.7	406.0	401.5	440.2
40	449.2	412.6	354.9	371.8	389.5	366.3	347.5	408.1
50	425.1	373.8	289.1	328.2	356.7	321.9	281.1	369.3
60	395.0	330.7	212.4	282.4	321.6	275.6	204.9	326.8
70	359.7	286.2	129.5	237.6	285.5	230.9	122.8	283.3
80	320.8	243.4	50.29	196.3	249.5	190.1	45.96	241.4
90	280.4	204.6	0.3877	160.8	215.4	155.5	0.5414	203.3
100	241.3	171.7	2.775	132.3	184.4	127.5	2.901	171.1
110	205.5	145.1	6.897	110.4	156.7	106.5	6.702	144.5
120	173.6	124.3	8.867	94.20	132.2	91.34	4.857	124.0
130	146.0	108.6	11.23	82.99	111.8	81.07	7.958	108.3
140	123.1	96.75	14.36	75.89	95.27	74.69	14.02	96.58
150	104.3	87.91	16.45	71.93	82.76	71.72	20.06	86.91
160	89.41	78.15	16.16	70.51	74.74	71.21	47.69	74.85
170	77.10	53.41	11.63	69.41	71.45	70.27	38.95	42.01
180	0	12.59	14.31	10.96	0.5451	11.47	13.60	13.85
DEG	LUMINOUS INTENSITY:cd							

	Zonal (lm)		Total (lm)	Percent
0-10	45.07	0 - 10	45.07	1.78%
10-20	130.60	0 - 20	175.67	6.93%
20-30	202.89	0 - 30	378.56	14.93%
30-40	255.01	0 - 40	633.57	24.98%
40-50	282.85	0 - 50	916.42	36.14%
50-60	285.64	0 - 60	1202.06	47.40%
60-70	266.24	0 - 70	1468.30	57.90%
70-80	231.26	0 - 80	1699.56	67.02%
80-90	191.16	0 - 90	1890.72	74.56%
90-100	156.90	0 - 100	2047.62	80.74%
100-110	129.34	0 - 110	2176.96	85.84%
110-120	105.15	0 - 120	2282.11	89.99%
120-130	83.96	0 - 130	2366.07	93.30%
130-140	65.51	0 - 140	2431.58	95.88%
140-150	48.84	0 - 150	2480.42	97.81%
150-160	33.54	0 - 160	2513.96	99.13%
160-170	18.05	0 - 170	2532.01	99.84%
170-180	3.98	0 - 180	2535.99	100.00%

4.0 Test Results

4.3 THD and PF Test

Model No.	L48T8/830/15P-XT (1H)	Sample ID.	DLF2602104-A1
Model No.	L48T8/850/15P-XT (1H)	Sample ID.	DLF2602104-A2
Temperature (°C)	25.3	Humidity (%RH)	56.0

Test Method

The samples were tested according to the ANSI C82.77-10:2020.

The ambient temperature shall be maintained at 25° C ± 1.0° C and 10% - 65% RH. 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

3000K

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
120.06	60	0.145	17.3	0.994	6.02%
277.01	60	0.069	17.9	0.930	12.93%

5000K

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
120.08	60	0.144	17.2	0.994	6.05%
277.06	60	0.069	17.8	0.929	12.85%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2025/12/10	2026/12/9
DLF108	Auxiliary Lamp	2025/12/10	2026/12/9
DLF122	Measurement Standard Lamp Standard Lamp Type: Tungsten, Omni-directional	2025/12/10	2026/12/9
DLF116	AC Power Source	2025/12/8	2026/12/7
DLF516	Power Meter	2025/12/8	2026/12/7
DLF112	Temperature Recorder	2025/12/15	2026/12/14
DLF114	Temperature & Humidity Datalogger	2025/12/11	2026/12/10
DLF521	Measurement Standard Lamp Standard Lamp Type: Tungsten, Omni-directional	2025/12/10	2026/12/9
DLF101	Goniophotometer	2025/12/10	2026/12/9
DLF511	AC Power Source	2025/12/8	2026/12/7
DLF512	AC Power Source	2025/12/8	2026/12/7
DLF513	AC Power Source	2025/12/8	2026/12/7
DLF507	DC Power Source	2025/12/8	2026/12/7
DLF111	Temperature & Humidity Datalogger	2025/12/11	2026/12/10
DLF119	Power Meter	2025/12/8	2026/12/7
DLF530	Hot-wire anemometer	2026/1/26	2027/1/25
DLF129	Clock	2025/9/4	2026/9/3

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