



Photometric Test Report

Relevant Standards

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

Prepared For

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Project Number

DLF2103111

Report Number

DLF2103111-3a

Test Date

2021/4/14

Issue Date

2021/4/25

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1.0 Test Summary

DLC Technical Requirements v5.1

T8 Four-Foot Linear Replacement Lamps 2-lamp External Driver Lamp-Style Retrofit Kits (UL Type C)				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm)	IES LM-79-2008	2000		1956
Luminaire Efficacy (lm/W)	IES LM-79-2008	120		171.8
Beam Angle	IES LM-79-2008	≥ 160		191.4
Total Harmonic Distortion (A%)	ANSI C82.77:2014	20%	120V	10.60%
			277V	7.23%
Power Factor	ANSI C82.77:2014	0.9	120V	0.993
			277V	0.985
Lamp light output (lm)	IES LM-79-2008 CIE 13.3-1995	1600		1943
				2012
				2046
				2034
Lamp Efficacy (lm/W)	IES LM-79-2008 CIE 13.3-1995	120		170.44
				175.72
				178.53
				177.87
Allowable CCTs* (K)	IES LM-79-2008	7 step	3045 $\pm$ 175	3010
		7 step	3465 $\pm$ 245	3419
		7 step	3985 $\pm$ 275	3912
		7 step	5029 $\pm$ 355	4960
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥ 70		83
				82
				83
				83
Minimum R9	IES LM-79-2008 CIE 13.3-1995	≥ 0		9
				8
				10
				8
Minimum Rf	ANSI/IES TM-30-18	≥ 70		85
				84
				84
				84
Minimum Rg	ANSI/IES TM-30-18	≥ 89		97
				97
				96
				97
IES Rcs,h1	ANSI/IES TM-30-18	$-12\% \leq \text{IES Rcs,h1} \leq +23\%$		-11%
				-12%
				-11%
				-12%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2021/4/14	L48T8/830/15G-XT	C1
			L48T8/835/15G-XT	C2
			L48T8/840/15G-XT	C3
			L48T8/850/15G-XT	C4
2	Goniophotometer Test	2021/4/14	L48T8/830/15G-XT	C1
3	THD and PF Test	2021/4/14	L48T8/830/15G-XT	C1

Remark(If any)

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3.0 Production Description

Luminaire Description: L48T8/830/15G-XT

Electrical Specification: 120-277V,60HZ

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 3000K

Model No.	L48T8/830/15G-XT	Sample ID.	C1
Operate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

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
120.04	60	0.191	22.8	0.993

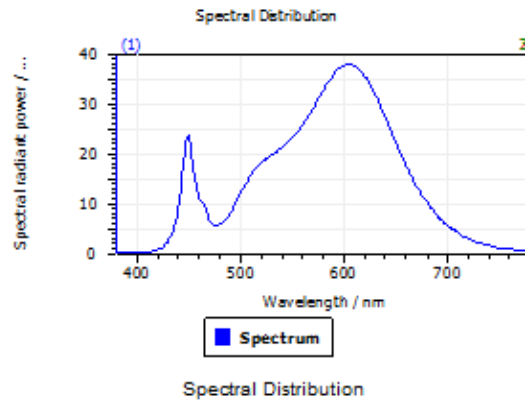
Test Result

CCT (K)	CRI	R9	Duv	THD
3010	83	9	0.00016	10.60%

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
85	97	-11%	1943	170.44

4.1 Integrating Sphere Test

Results



Spectral values

DominantWavelength 582.72 nm
Purity 0.524
PeakWavelength 604.48 nm
Radiant Power 5.659 W
Width50%:

Date: 2021/3/12 19:15:50

Color Coordinates

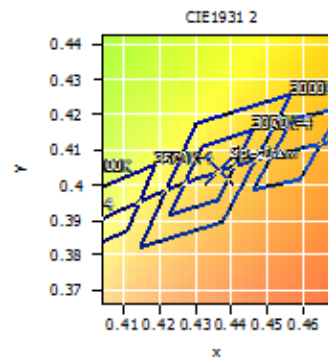
Correlated Color Temperatu 3010 K

x: 0.4364 u: 0.2502 u': 0.2502

y: 0.4043 v: 0.3476 v': 0.5214

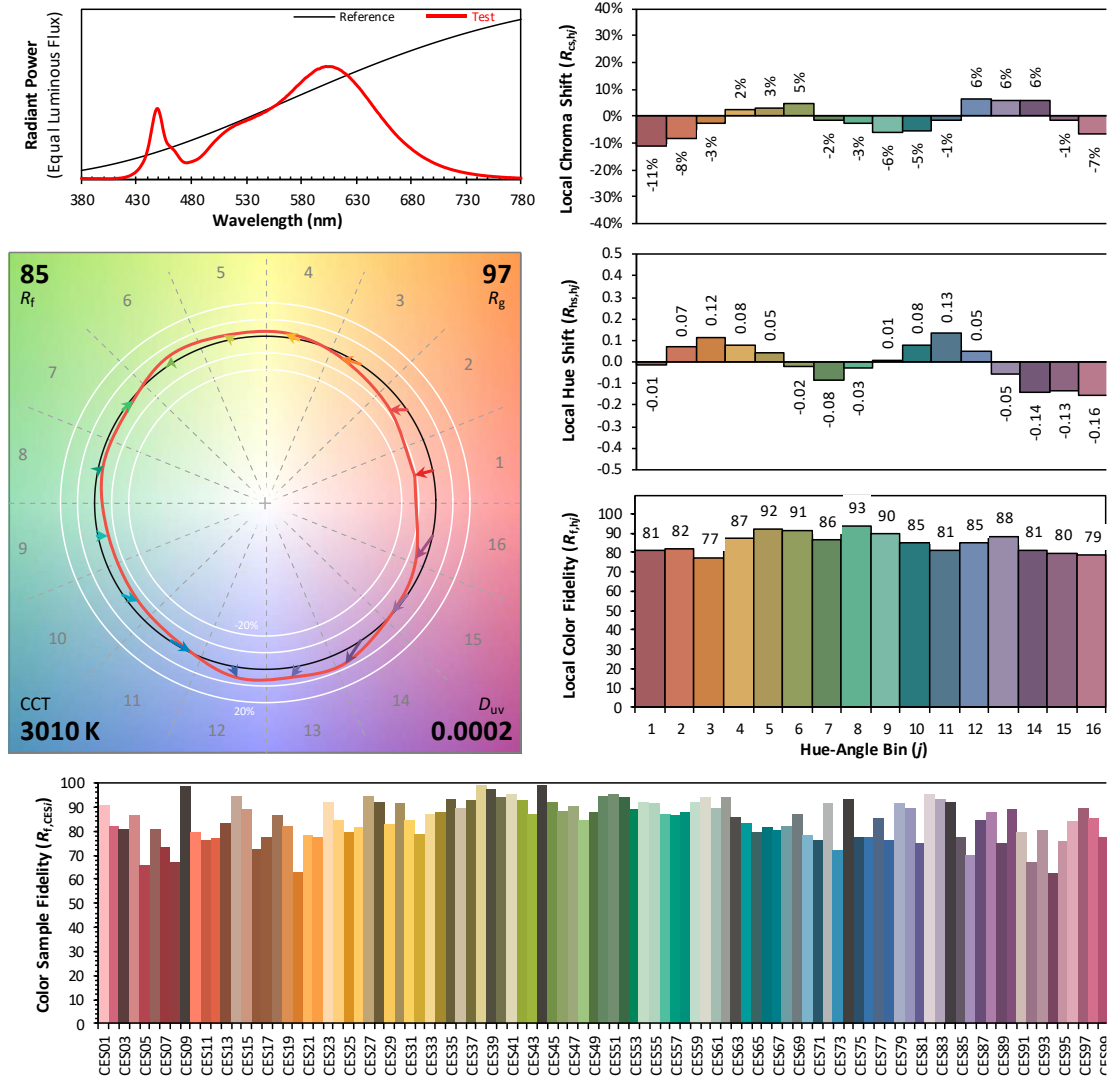
CRI01	81.3	CRI09	8.5
CRI02	90.2	CRI10	77.9
CRI03	96.9	CRI11	82.2
CRI04	82.1	CRI12	70.5
CRI05	81.7	CRI13	83.4
CRI06	88.4	CRI14	98.7
CRI07	83.4	CRI15	73.6
CRI08	60.0	CRI16	71.5

ResultsCRI 83.0



PlanckDistance 1.6E-004

4.1 Integrating Sphere Test



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

x 0.4364
 y 0.4043
 u' 0.2502
 v' 0.5214

CIE 13.3-1995
 (CRI)

R_a 83
 R_g 9

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 3500K

Model No.	L48T8/835/15G-XT	Sample ID.	C2
Operate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

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	0.192	22.9	0.993

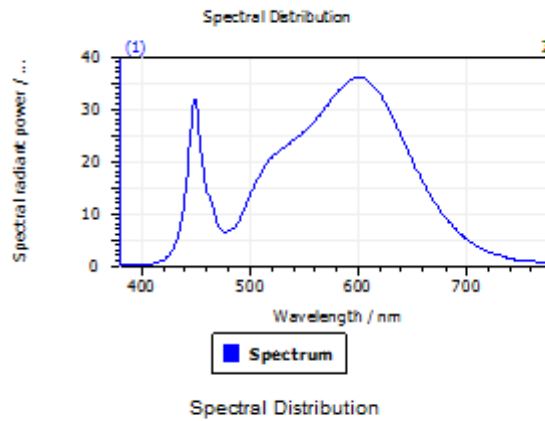
Test Result

CCT (K)	CRI	R9	Duv	THD
3419	82	8	0.00061	10.50%

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
84	97	-12%	2012	175.72

4.1 Integrating Sphere Test

Results



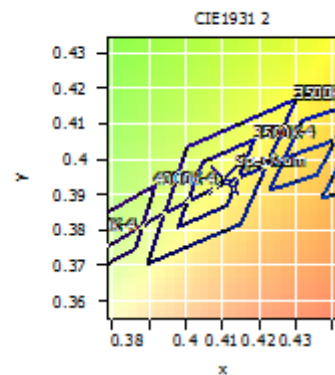
Spectral values

DominantWavelength 580.93 nm
Purity 0.417
PeakWavelength 600.26 nm
Radiant Power 5.817 W
Width50%:

Date: 2021/3/15 9:39:15

Color Coordinates

Correlated Color Temperatu 3419 K
x: 0.4106 u: 0.2375 u': 0.2375
y: 0.3947 v: 0.3425 v': 0.5137
CRI01 80.7 CRI09 8.2
CRI02 88.4 CRI10 73.2
CRI03 95.0 CRI11 81.4
CRI04 82.0 CRI12 64.3
CRI05 80.8 CRI13 82.4
CRI06 85.0 CRI14 97.2
CRI07 85.0 CRI15 73.7
CRI08 62.4 CRI16 72.2
ResultsCRI 82.4



PlankDistance 6.1E-004

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 4000K

Model No.	L48T8/840/15G-XT	Sample ID.	C3
Operate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

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	0.193	22.9	0.992

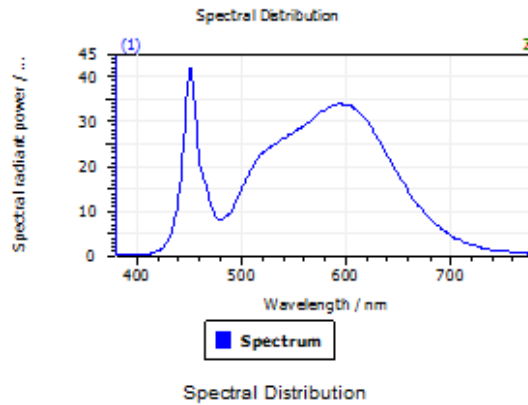
Test Result

CCT (K)	CRI	R9	Duv	THD
3912	83	10	0.0012	10.62%

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
84	96	-11%	2046	178.53

4.1 Integrating Sphere Test

Results



Spectral values

DominantWavelength 578.82 nm
Purity 0.304
PeakWavelength 450.87 nm
Radiant Power 5.94 W
Width50%:

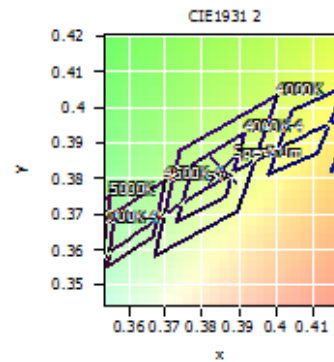
Date: 2021/3/12 19:51:43

Color Coordinates

Correlated Color Temperatu 3912 K

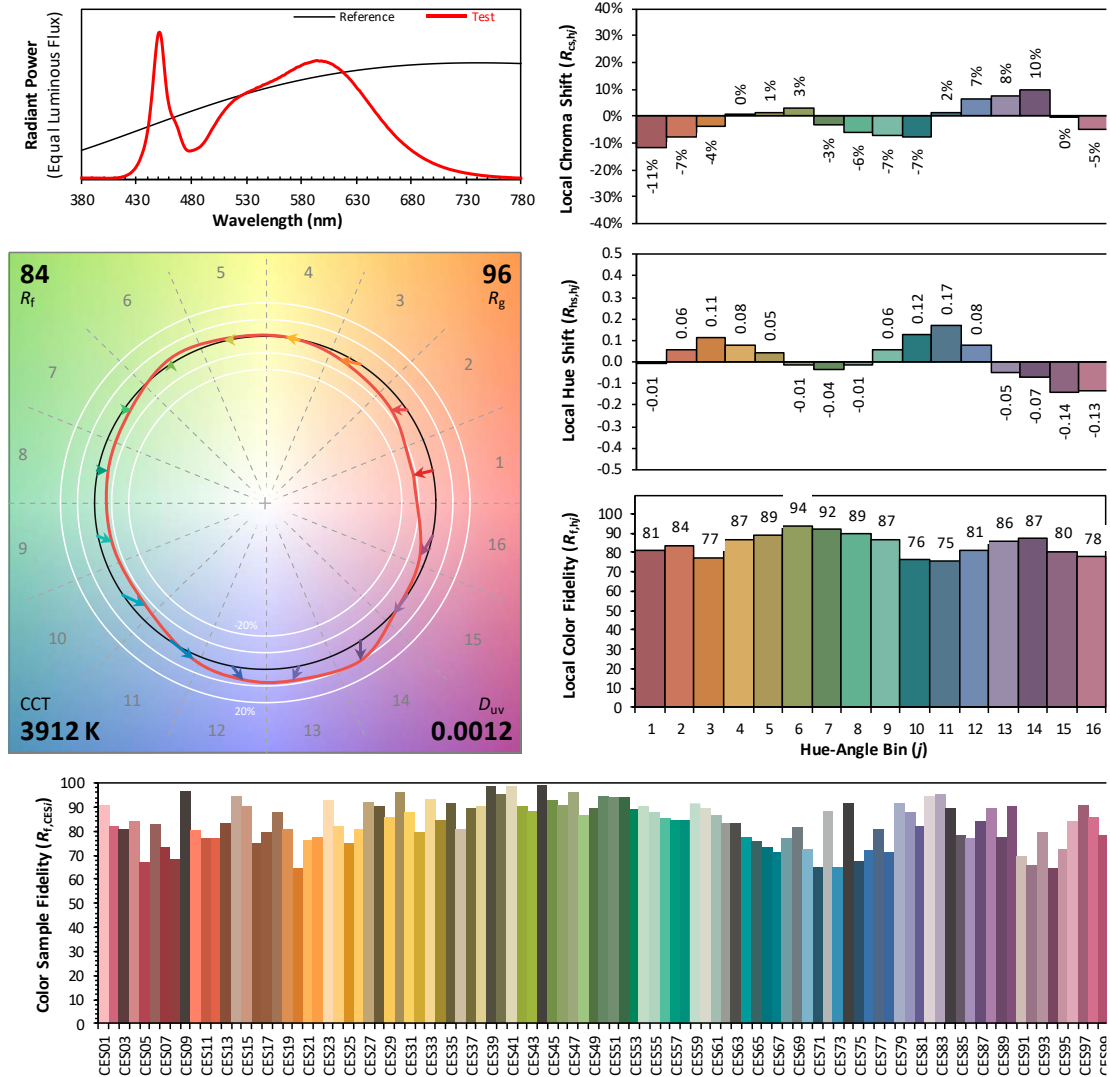
x: 0.3853 u: 0.2261 u': 0.2261
y: 0.3822 v: 0.3365 v': 0.5047

CRI01	81.0	CRI09	10.4
CRI02	88.0	CRI10	71.5
CRI03	93.3	CRI11	80.9
CRI04	82.2	CRI12	58.1
CRI05	80.9	CRI13	82.6
CRI06	83.7	CRI14	96.2
CRI07	86.6	CRI15	74.8
CRI08	65.4	CRI16	73.1
ResultsCRI	82.6		



PlanckDistance 1.2E-003

4.1 Integrating Sphere Test



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

x 0.3853
 y 0.3822
 u' 0.2261
 v' 0.5047

CIE 13.3-1995
 (CRI)

R_a 83

R_g 11

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 5000K

Model No.	L48T8/850/15G-XT	Sample ID.	C4
Operate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

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	0.192	22.9	0.993

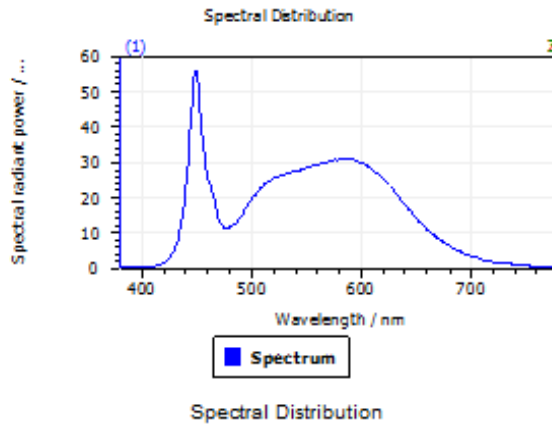
Test Result

CCT (K)	CRI	R9	Duv	THD
4960	83	8	0.0024	10.74%

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
84	97	-12%	2034	177.87

4.1 Integrating Sphere Test

Results



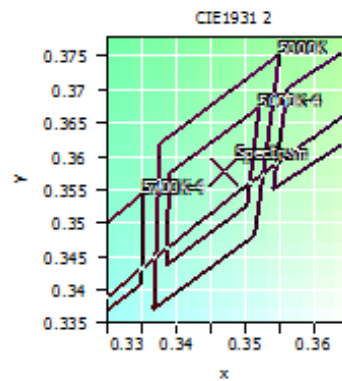
Spectral values

DominantWavelength 571.03 nm
Purity 0.114
PeakWavelength 448.89 nm
Radiant Power 6.052 W
Width50%:

Date: 2021/3/15 9:05:51

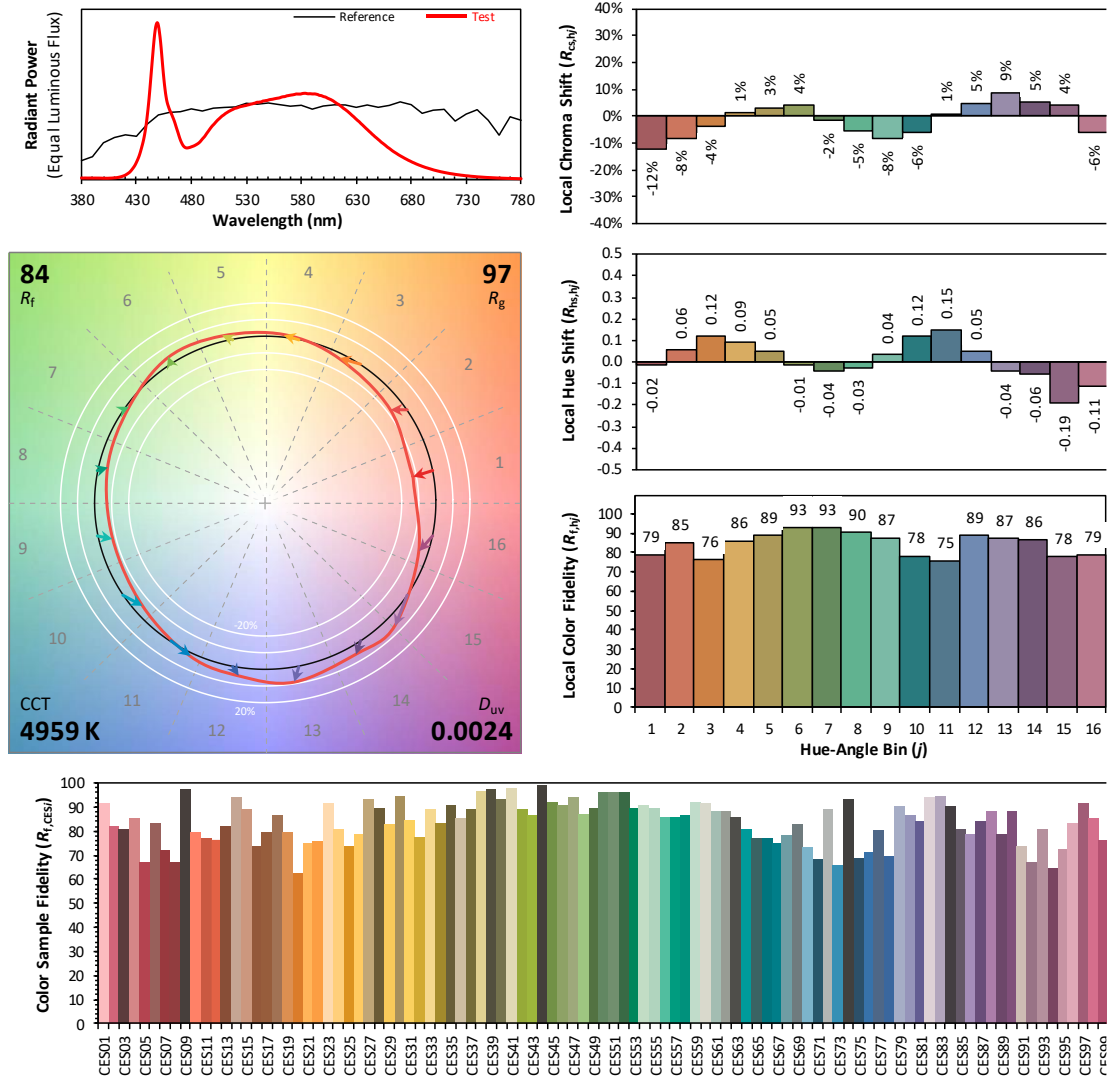
Color Coordinates

Correlated Color Temperatu 4960 K
x: 0.3468 u: 0.2102 u': 0.2102
y: 0.3578 v: 0.3253 v': 0.4879
CRI01 81.6 CRI09 8.4
CRI02 87.4 CRI10 70.5
CRI03 91.9 CRI11 84.2
CRI04 84.3 CRI12 62.4
CRI05 82.7 CRI13 82.8
CRI06 82.9 CRI14 95.7
CRI07 86.9 CRI15 75.7
CRI08 67.9 CRI16 74.6
ResultsCRI 83.2



PlankDistance 2.4E-003

4.1 Integrating Sphere Test



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

x 0.3468
 y 0.3578
 u' 0.2102
 v' 0.4879

CIE 13.3-1995
 (CRI)

R_a 83

R_g 9

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test - 3000K

Model No.	L48T8/830/15G-XT	Sample ID.	C1
Operate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

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

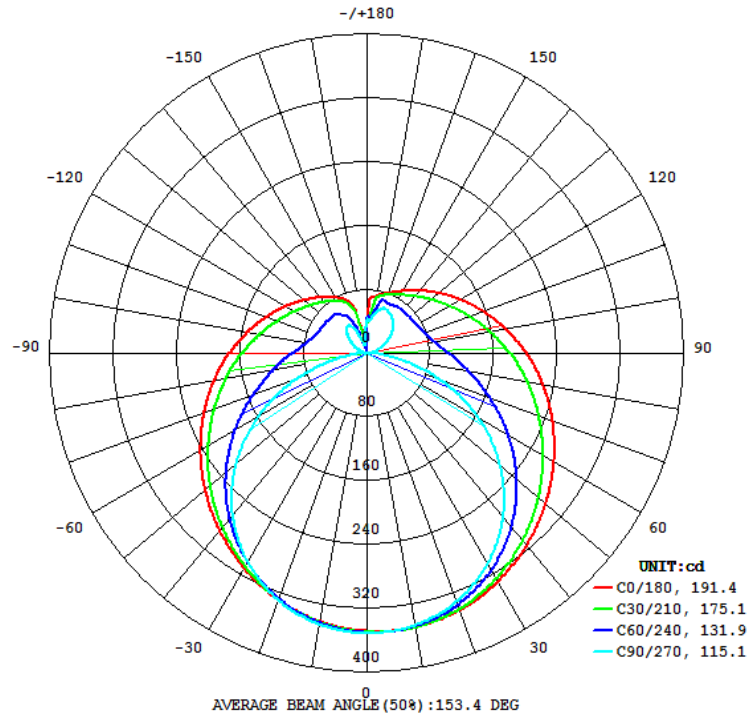
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WROST CASE	120.05	60	0.191	22.8	0.993

Test Result

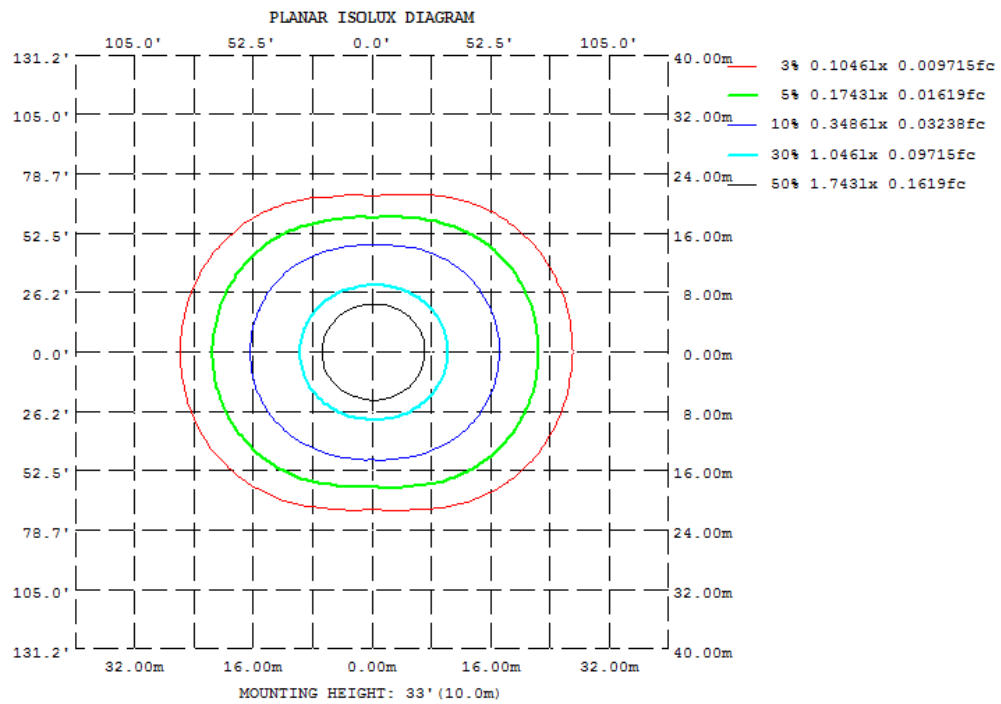
Flux (lm)	Luminous Efficacy (lm/W)	Beam Angle
1956	171.8	191.4

4.2 Goniophotometer Test

Zonal Lumen Summary



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	348.6	348.4	346.3	345.2	341.8	342.9	345.3	349.5
20	342.4	338.2	330.9	330.3	328.8	327.7	329.0	338.8
30	330.5	320.6	304.8	308.1	310.9	305.1	301.9	320.6
40	314.1	296.2	268.0	280.2	289.9	277.7	263.9	296.1
50	294.7	267.2	220.5	249.3	266.6	247.1	215.9	267.1
60	273.0	235.8	163.3	217.2	242.6	215.3	158.9	236.1
70	249.9	204.9	98.74	186.4	218.9	184.9	95.43	205.7
80	225.9	176.4	35.70	159.0	196.0	157.8	33.57	177.8
90	201.8	151.4	0.7594	135.6	174.3	134.6	0.3883	153.3
100	178.6	130.6	1.637	116.6	154.3	115.6	1.653	132.4
110	156.7	113.7	12.15	101.6	135.8	100.5	8.743	115.5
120	136.5	100.6	28.72	90.08	119.3	89.38	18.44	102.2
130	118.7	90.99	42.82	82.32	104.7	81.52	30.18	92.28
140	103.3	83.89	53.35	76.08	92.53	75.37	41.00	85.01
150	90.58	78.40	59.17	70.62	81.66	70.24	40.34	79.23
160	80.84	74.02	60.28	41.99	70.22	57.46	16.11	69.26
170	73.36	61.01	48.35	0.9602	1.413	0.6092	17.70	52.89
180	9.545	35.54	44.24	33.32	18.31	27.55	43.18	40.98
DEG	LUMINOUS INTENSITY:cd							

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	L48T8/830/15G-XT	Sample ID.	C1
Temperature (°C)	25.1	Humidity (%RH)	52.0

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
120.04	60	0.191	22.8	0.993	10.60%
276.98	60	0.084	22.8	0.985	7.23%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2020/12/26	2021/12/25
DLF108	Auxiliary Lamp	2020/12/26	2021/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2020/12/26	2021/12/25
DLF116	AC Power Source	2020/12/26	2021/12/25
DLF113	Power Meter	2020/12/26	2021/12/25
DLF112	Temperature Recorder	2020/12/26	2021/12/25
DLF114	Temperature & Humidity Datalogger	2020/12/26	2021/12/25
DLF101	Goniophotometer	2020/12/26	2021/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2020/12/26	2021/12/25
DLF104	AC Power Source	2020/12/26	2021/12/25
DLF507	DC Power Source	2020/12/26	2021/12/25
DLF102	Power Meter	2020/12/26	2021/12/25
DLF111	Temperature & Humidity Datalogger	2020/12/26	2021/12/25
DLF119	Power Meter	2020/12/26	2021/12/25
DLF031	Temperature data logger	2020/12/26	2021/12/25
DLF022	Digital power meter	2020/12/26	2021/12/25
DLF003	Temperature & Humidity Datalogger	2020/12/26	2021/12/25

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