

Photometric Test Report

Relevant Standards

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

Prepared For

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Test Date

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Issue Date

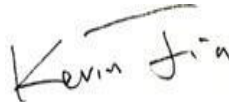
2020/11/30

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

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1.0 Test Summary

DLC Technical Requirements v5.0

T8 Two-Foot Linear Replacement Lamps 2-lamp External Driver (UL Type C) Lamps				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm)	IES LM-79-2008	800		1513
Luminaire Efficacy (lm/W)	IES LM-79-2008	120		121.5
Beam Angle	IES LM-79-2008	≥ 160		191.1
Total Harmonic Distortion (A%)	ANSI C82.77:2014	20%	120V	7.69%
			277V	11.21%
Power Factor	ANSI C82.77:2014	0.9	120V	0.991
			277V	0.899
Lamp light output (lm)	IES LM-79-2008 CIE 13.3-1995	1600		1455
				1461
				1501
				1529
Lamp Efficacy (lm/W)	IES LM-79-2008 CIE 13.3-1995	120		117.81
				119.51
				122.63
				124.31
Allowable CCTs* (K)	IES LM-79-2008	7 step	3045 $\pm$ 175	3028
		7 step	3465 $\pm$ 245	3454
		7 step	3985 $\pm$ 275	3972
		7 step	5029 $\pm$ 355	5027
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥ 80		93
				93
				93
				93
Minimum R9	IES LM-79-2008 CIE 13.3-1995	≥ 0		55
				57
				57
				58
Minimum Rf	ANSI/IES TM-30-18	≥ 70		91
				91
				90
				90
Minimum Rg	ANSI/IES TM-30-18	≥ 89		97
				96
				96
				97
IES Rcs,h1	ANSI/IES TM-30-18	$-12\% \leq \text{IES Rcs,h1} \leq +23\%$		-6%
				-5%
				-6%
				-6%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2020/11/27	L24T8_930_8G-XT	A1
			L24T8_935_8G-XT	A2
			L24T8_940_8G-XT	A3
			L24T8_950_8G-XT	A4
2	Goniophotometer Test	2020/11/27	L24T8_930_8G-XT	A1
3	THD and PF Test	2020/11/27	L24T8_930_8G-XT	A1

Remark(If any)

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- 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: L24T8_930_8G-XT

Electrical Specification: 120-277V,60HZ

Fixture:

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 3000K

Model No.	L24T8_930_8G-XT	Sample ID.	A1
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
120.08	60	0.208	24.7	0.991

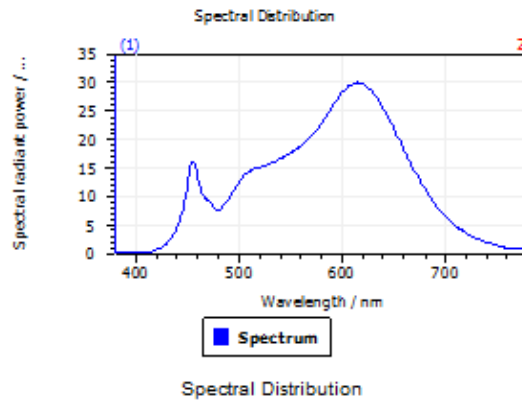
Test Result

CCT (K)	CRI	R9	Duv
3028	93	55	0.00054

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
91	97	-6%	1455	117.81

4.1 Integrating Sphere Test

Results

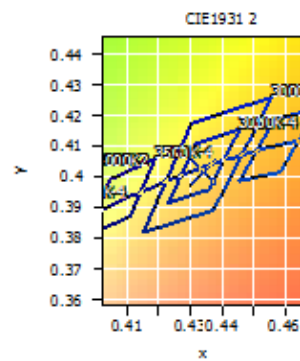


Spectral values

DominantWavelength	582.90 nm
Purity	0.509
PeakWavelength	615.05 nm
Radiant Power	4.818 W
Width50%:	
Luminous Flux	1.455 klm

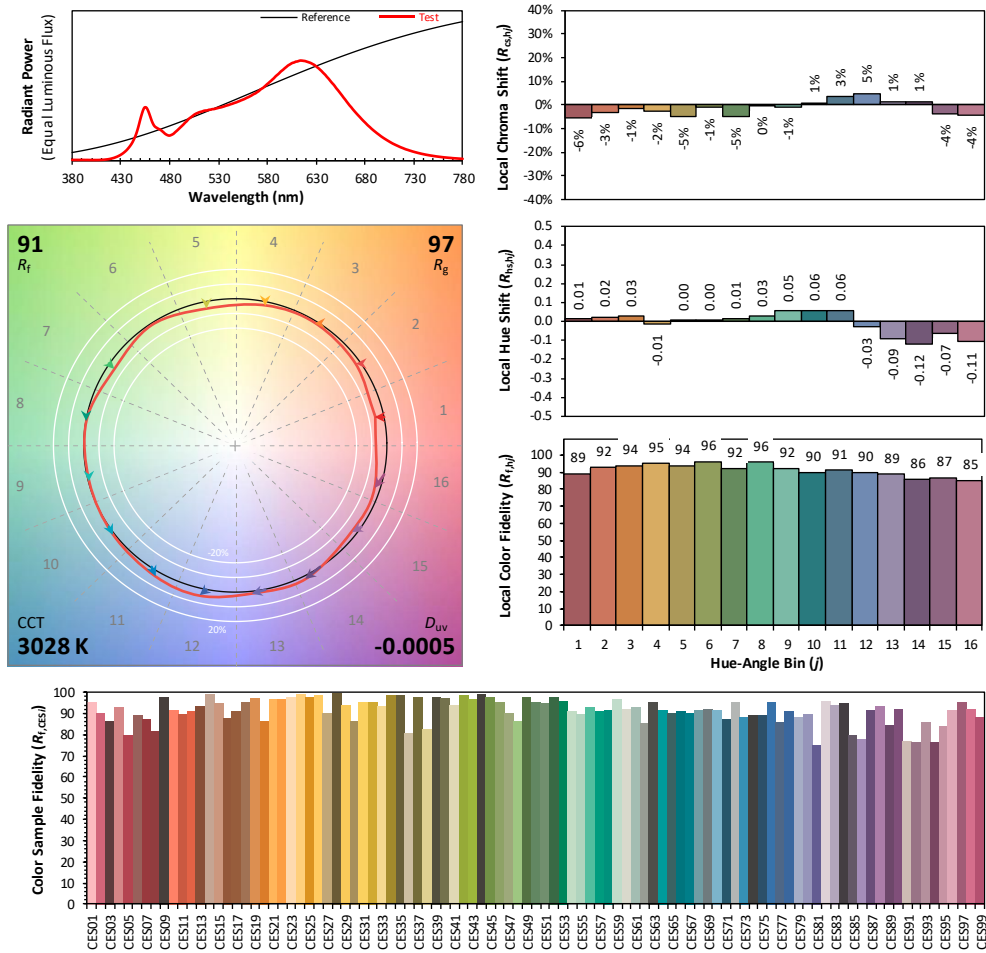
Color Coordinates

Correlated Color Temperature		3028 K	
x: 0.4342	u: 0.2498	u': 0.2498	
y: 0.4018	v: 0.3467	v': 0.5201	
CRI01	95.0	CRI09	54.8
CRI02	99.2	CRI10	98.0
CRI03	96.7	CRI11	97.9
CRI04	94.7	CRI12	84.7
CRI05	95.4	CRI13	96.7
CRI06	96.1	CRI14	98.9
CRI07	89.8	CRI15	89.5
CRI08	79.4	CRI16	86.2
ResultsCRI	93.3		



PlanckDistance 5.4E-004

4.1 Integrating Sphere Test



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

x 0.4342
 y 0.4018
 u' 0.2498
 v' 0.5201

CIE 13.3-1995
(CRI)

R_a 93
 R_9 53

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 3500K

Model No.	L24T8_930_8G-XT	Sample ID.	A1
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
119.96	60	0.205	24.5	0.992

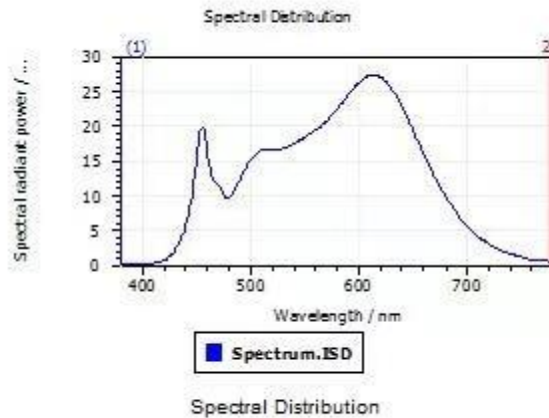
Test Result

CCT (K)	CRI	R9	Duv
3454	93	57	0.00058

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
91	96	-5%	1461	119.51

4.1 Integrating Sphere Test

Results



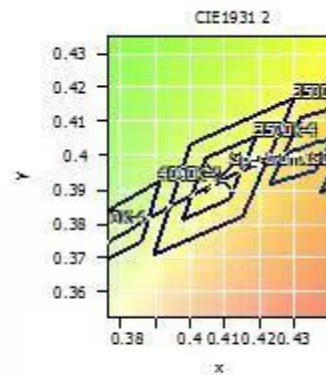
Spectral values

DominantWavelength	580.81 nm
Purity	0.408
PeakWavelength	612.76 nm
Radiant Power	4.795 W
Width50%	
Luminous Flux	1.461 klm

Date: 2020/12/22 12:29:49

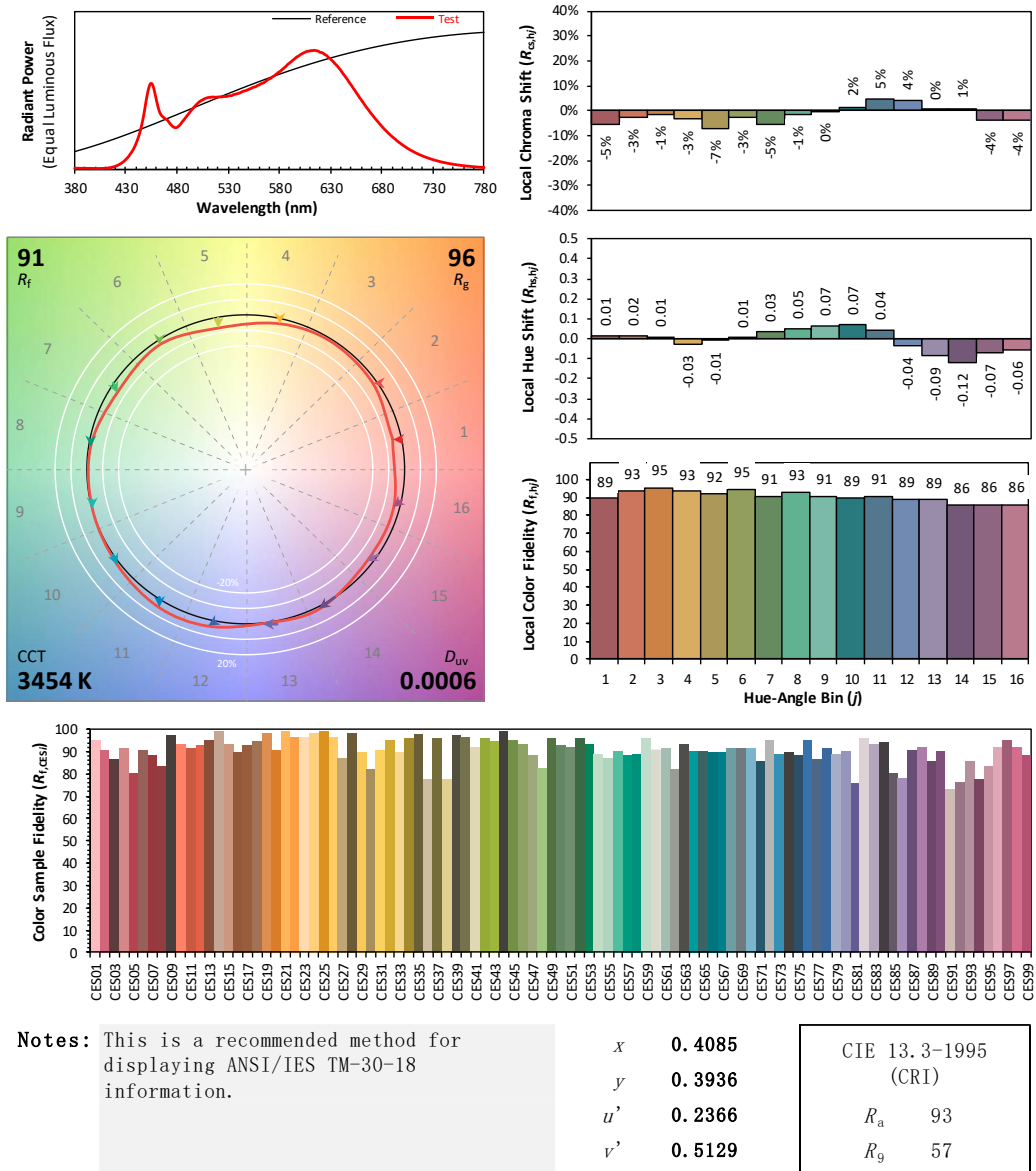
Color Coordinates

Correlated Color Temperatu		3454 K
x: 0.4085	u: 0.2366	u': 0.2366
y: 0.3936	v: 0.3420	v': 0.5129
CRI01	95.3	CRI09
CRI02	99.7	CRI10
CRI03	95.4	CRI11
CRI04	94.1	CRI12
CRI05	95.6	CRI13
CRI06	95.9	CRI14
CRI07	89.7	CRI15
CRI08	80.4	CRI16
ResultsCRI	93.3	



PlanckDistance 5.8E-004

4.1 Integrating Sphere Test



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4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 4000K

Model No.	L24T8_930_8G-XT	Sample ID.	A1
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

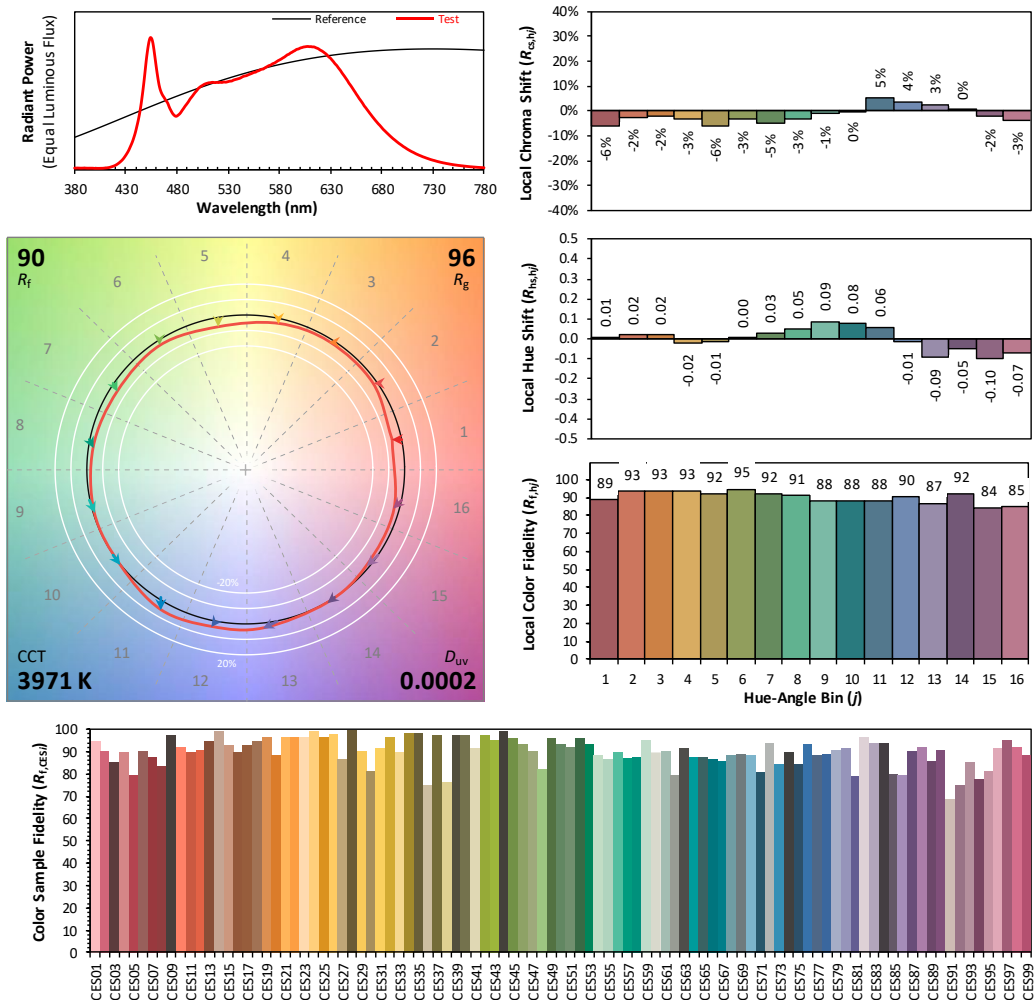
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
119.97	60	0.206	24.5	0.992

Test Result

CCT (K)	CRI	R9	Duv
3972	93	57	0.0002

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
90	96	-6%	1501	122.63

4.1 Integrating Sphere Test



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

x 0.3819
 y 0.3781
 u' 0.2255
 v' 0.5024

CIE 13.3-1995
(CRI)

R_a 93
 R_g 56

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4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 5000K

Model No.	L24T8_950_8G-XT	Sample ID.	A4
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
119.98	60	0.207	24.6	0.991

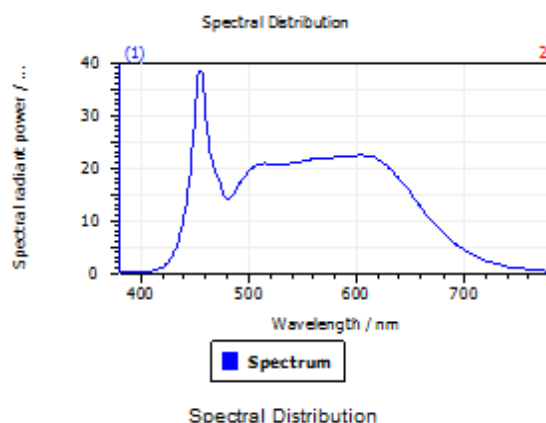
Test Result

CCT (K)	CRI	R9	Duv
5027	93	58	0.0027

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
90	97	-6%	1529	124.31

4.1 Integrating Sphere Test

Results

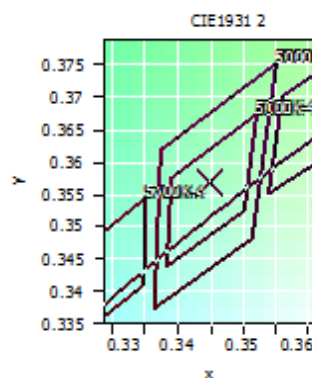


Spectral values

DominantWavelength	569.78 nm
Purity	0.106
PeakWavelength	454.77 nm
Radiant Power	5.113 W
Width50%:	
Luminous Flux	1.529 klm

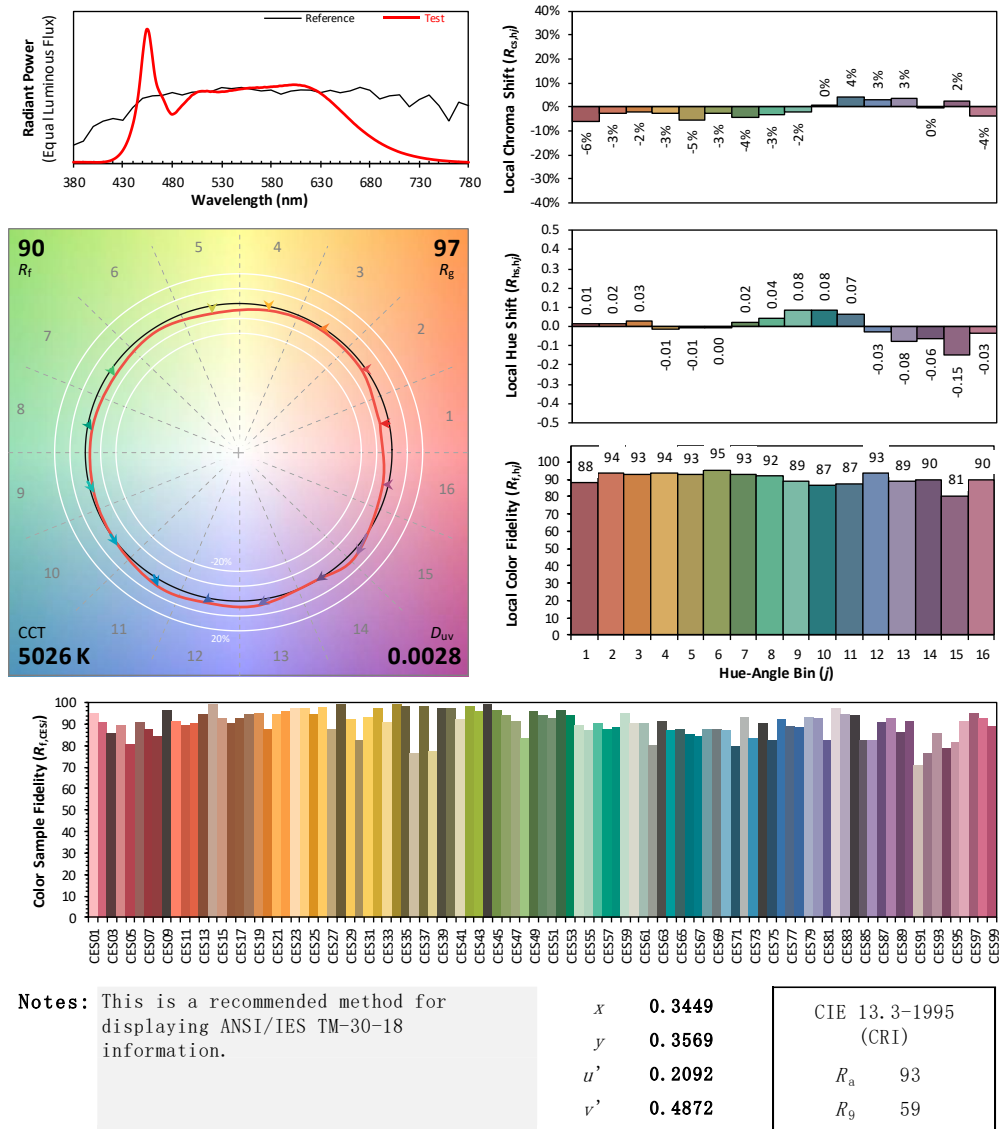
Color Coordinates

Correlated Color Temperatu	5027 K		
x: 0.3449	u: 0.2092	u': 0.2092	
y: 0.3569	v: 0.3248	v': 0.4872	
CRI01	93.6	CRI09	57.8
CRI02	98.4	CRI10	96.1
CRI03	96.8	CRI11	94.0
CRI04	91.8	CRI12	75.5
CRI05	93.2	CRI13	95.7
CRI06	95.2	CRI14	98.7
CRI07	91.1	CRI15	89.9
CRI08	82.5	CRI16	84.6
ResultsCRI	92.8		



PlanckDistance 2.7E-003

4.1 Integrating Sphere Test



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4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test - 3000K

Model No.	L24T8_930_8G-XT	Sample ID.	A1
Opreate 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 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

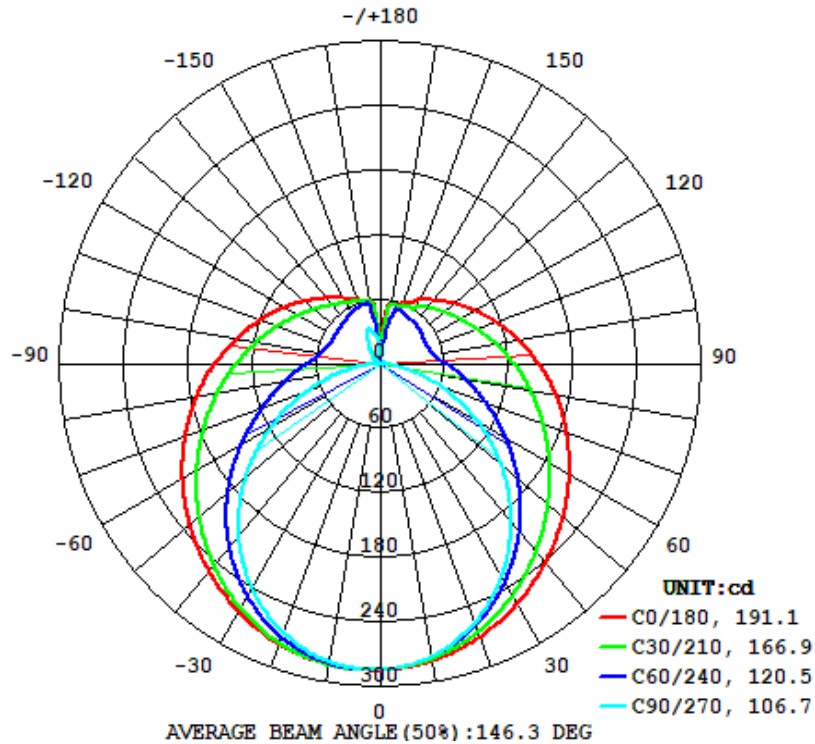
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WROST CASE	120.08	60	0.224	24.9	0.924

Test Result

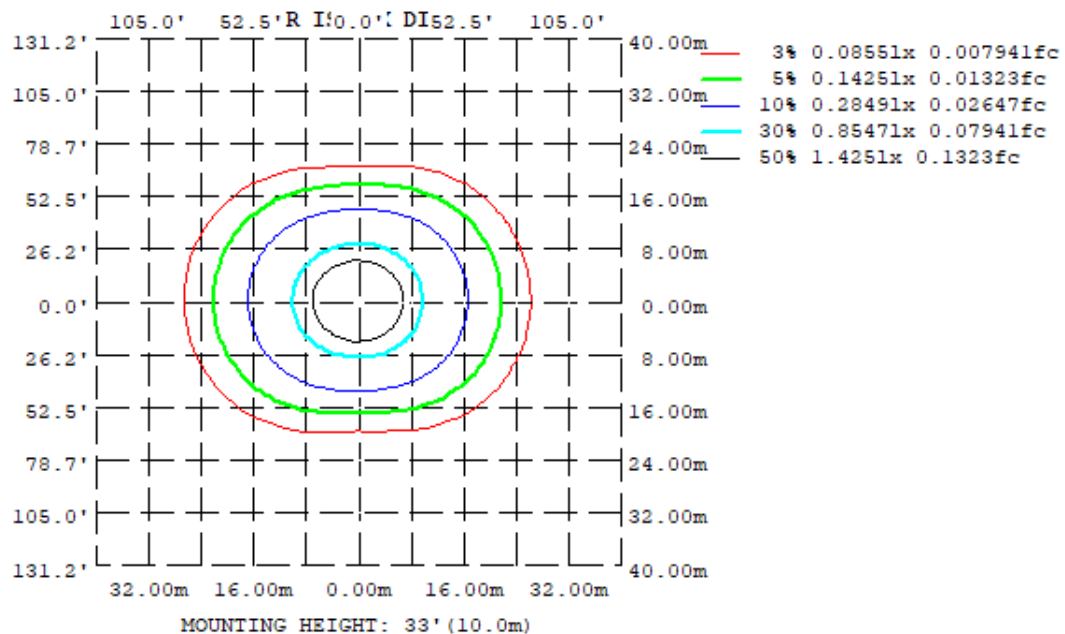
Flux (lm)	Luminous Efficacy (lm/W)	Beam Angle
1513	121.5	191.1

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	γ	Φ zone	Φ total	\$lum,lamp	
10	279.9	276.9	275.7	279.5	283.9	283.1	281.1	280.4	0-10	26.93	26.93	1.78,1.78	
20	270.1	261.6	256.5	266.4	277.4	273.7	266.3	268.6	10-20	77.59	104.5	6.91,6.91	
30	256.6	240.3	227.6	246.4	265.9	256.3	241.0	250.0	20-30	119.3	223.8	14.8,14.8	
40	240.4	214.9	190.9	221.3	250.5	232.6	206.5	226.6	30-40	147.8	371.6	24.6,24.6	
50	222.7	187.7	148.9	194.1	232.8	205.4	165.4	200.7	40-50	161.6	533.2	35.3,35.3	
60	204.4	161.1	103.9	167.4	213.8	177.5	120.0	174.8	50-60	161.3	694.6	45.9,45.9	
70	185.6	136.8	58.61	143.0	194.3	151.0	72.96	150.6	60-70	149.9	844.4	55.8,55.8	
80	167.0	116.3	18.41	122.1	174.7	127.7	28.82	129.0	70-80	131.4	975.9	64.5,64.5	
90	149.0	99.46	0.8516	104.9	155.8	108.6	1.970	110.4	80-90	111.4	1087	71.9,71.9	
100	131.9	86.29	2.167	91.17	137.7	93.43	1.547	94.23	90-100	94.67	1182	78.1,78.1	
110	116.1	76.38	5.194	80.37	121.1	81.71	5.646	82.32	100-110	81.04	1263	83.5,83.5	
120	101.8	69.13	4.227	72.33	105.8	73.08	2.112	73.86	110-120	68.69	1332	88,88	
130	89.10	64.50	0.5219	66.68	92.37	67.20	8.129	67.64	120-130	57.29	1389	91.8,91.8	
140	78.30	61.42	0.3911	62.94	80.77	63.39	13.00	63.53	130-140	46.57	1436	94.9,94.9	
150	69.46	57.57	0.5126	60.43	71.37	61.39	22.50	59.72	140-150	36.05	1472	97.3,97.3	
160	61.00	56.31	0.7889	58.88	64.26	60.54	36.10	56.02	150-160	25.03	1497	98.9,98.9	
170	56.96	48.16	0.5046	53.73	59.70	59.15	28.79	41.22	160-170	13.53	1510	99.8,99.8	
180	0.4696	4.546	0.5568	0.6713	0.4690	2.966	8.393	5.269	170-180	2.481	1513	100,100	
DEG	LUMINOUS INTENSITY:cd										UNIT:lm		

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	L24T8_930_8G-XT	Sample ID.	A1
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
119.99	60	0.209	24.8	0.991	7.69%
276.99	60	0.098	24.3	0.899	11.21%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2019/12/26	2020/12/25
DLF108	Auxiliary Lamp	2019/12/26	2020/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2019/12/26	2020/12/25
DLF116	AC Power Source	2019/12/26	2020/12/25
DLF113	Power Meter	2019/12/26	2020/12/25
DLF112	Temperature Recorder	2019/12/26	2020/12/25
DLF114	Temperature & Humidity Datalogger	2019/12/26	2020/12/25
DLF101	Goniophotometer	2019/12/26	2020/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2019/12/26	2020/12/25
DLF104	AC Power Source	2019/12/26	2020/12/25
DLF507	DC Power Source	2019/12/26	2020/12/25
DLF102	Power Meter	2019/12/26	2020/12/25
DLF111	Temperature & Humidity Datalogger	2019/12/26	2020/12/25
DLF119	Power Meter	2019/12/26	2020/12/25
DLF031	Temperature data logger	2019/12/26	2020/12/25
DLF022	Digital power meter	2019/12/26	2020/12/25
DLF003	Temperature & Humidity Datalogger	2019/12/26	2020/12/25

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