

Photometric Test Report

Relevant Standards

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

Prepared For

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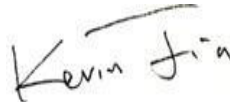
2020/11/30

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

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

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1.0 Test Summary

DLC Technical Requirements v5.0

T8 Three-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	1200		1961
Luminaire Efficacy (lm/W)	IES LM-79-2008	120		122.2
Beam Angle	IES LM-79-2008	$\geq 75\%$		198.0
Total Harmonic Distortion (A%)	ANSI C82.77:2014	20%	120V	8.40%
			277V	11.31%
Power Factor	ANSI C82.77:2014	0.9	120V	0.993
			277V	0.903
Lamp light output (lm)	IES LM-79-2008 CIE 13.3-1995	1600		1900
				1897
				1951
				2004
Lamp Efficacy (lm/W)	IES LM-79-2008 CIE 13.3-1995	120		118.12
				123.86
				126.98
				128.87
Allowable CCTs* (K)	IES LM-79-2008	7 step	3045 $\pm$ 175	3031
		7 step	3465 $\pm$ 245	3447
		7 step	3985 $\pm$ 275	3968
		7 step	5029 $\pm$ 355	5050
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥ 80		93
				94
				93
				93
Minimum R9	IES LM-79-2008 CIE 13.3-1995	≥ 0		56
				59
				59
				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	$-12\% \leq \text{IES Rcs,h1} \leq +23\%$		-5%
				-5%
				-6%
				-6%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2020/11/27	L36T8_930_11G-XT	B1
			L36T8_935_11G-XT	B2
			L36T8_940_11G-XT	B3
			L36T8_950_11G-XT	B4
2	Goniophotometer Test	2020/11/27	L36T8_930_11G-XT	B1
3	THD and PF Test	2020/11/27	L36T8_930_11G-XT	B1

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: L36T8_930_11G-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.	L36T8_930_11G-XT	Sample ID.	B1
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
120.01	60	0.270	32.2	0.993

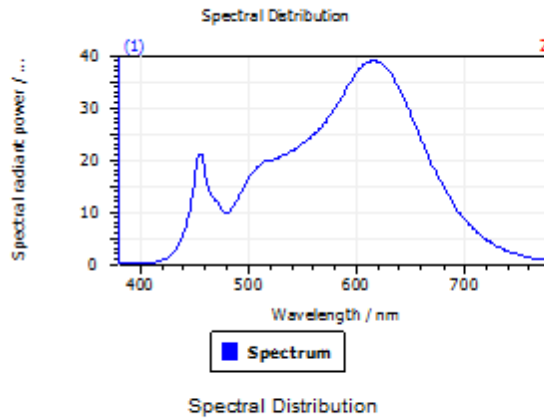
Test Result

CCT (K)	CRI	R9	Duv
3031	93	56	0.00059

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
91	97	-5%	1900	118.12

4.1 Integrating Sphere Test

Results

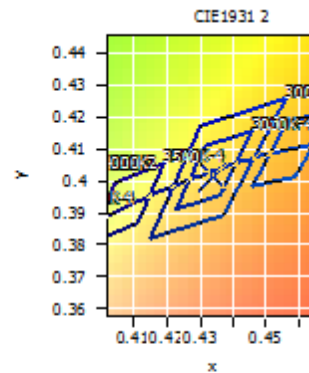


Spectral values

DominantWavelength	582.91 nm
Purity	0.508
PeakWavelength	615.44 nm
Radiant Power	6.3 W
Width50%:	
Luminous Flux	1.9 klm

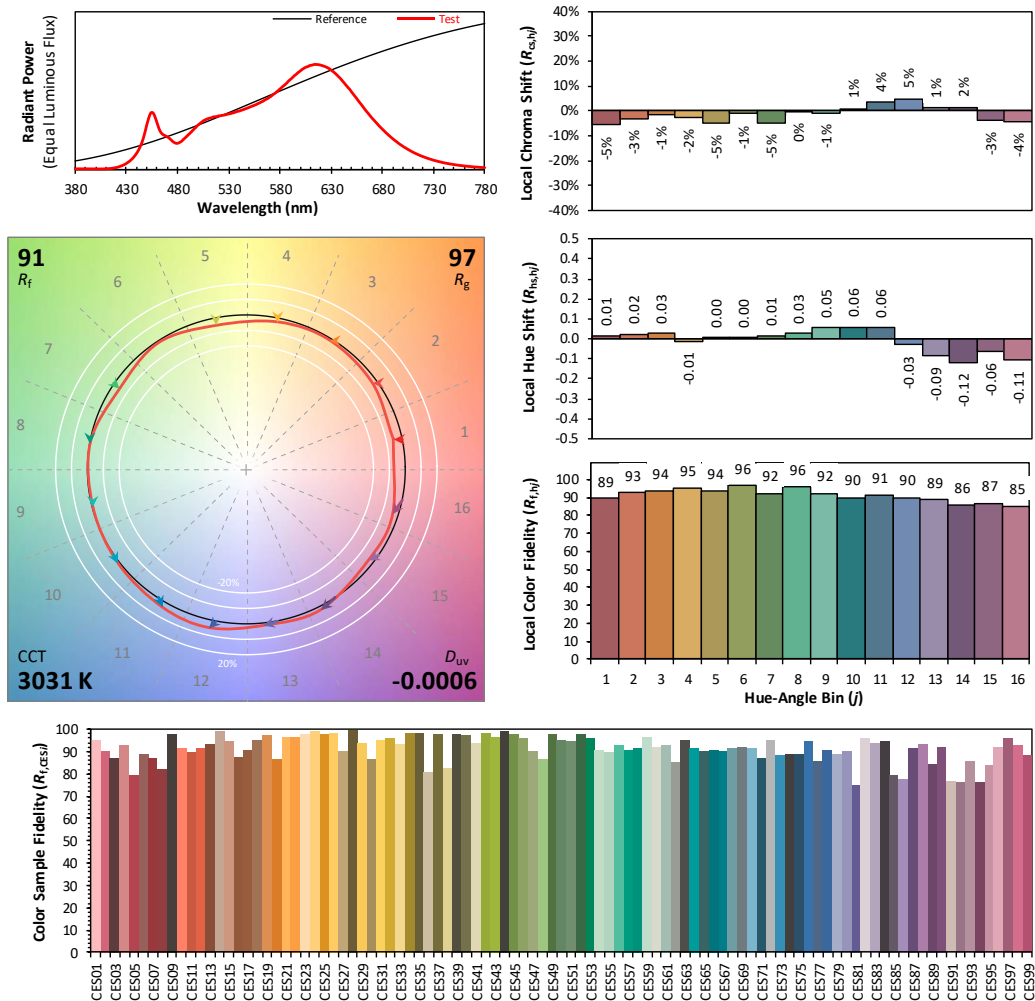
Color Coordinates

Correlated Color Temperature		3031 K
x: 0.4339	u: 0.2497	u': 0.2497
y: 0.4015	v: 0.3488	v': 0.5199
CRI01	95.2	CRI09
CRI02	99.3	CRI10
CRI03	96.6	CRI11
CRI04	94.8	CRI12
CRI05	95.6	CRI13
CRI06	96.0	CRI14
CRI07	89.9	CRI15
CRI08	79.7	CRI16
ResultsCRI	93.4	



PlanckDistance 5.9E-004

4.1 Integrating Sphere Test



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

x 0.4339
 y 0.4015
 u' 0.2497
 v' 0.5199

CIE 13.3-1995
(CRI)

R_a 93
 R_g 54

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.	L36T8_930_11G-XT	Sample ID.	B1
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 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	0.257	30.6	0.993

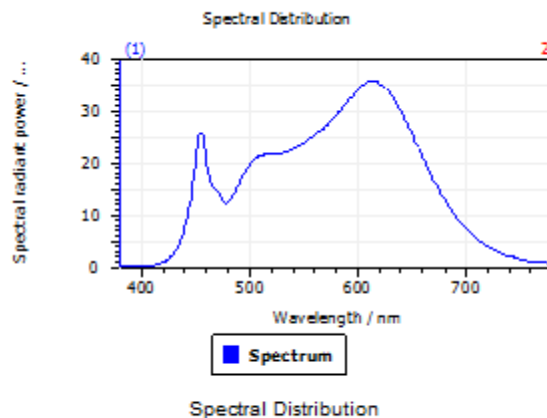
Test Result

CCT (K)	CRI	R9	Duv
3447	94	59	0.00053

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
91	96	-5%	1897	123.86

4.1 Integrating Sphere Test

Results

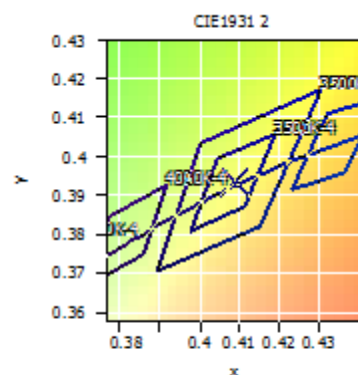


Spectral values

DominantWavelength	580.86 nm
Purity	0.409
PeakWavelength	613.25 nm
Radiant Power	6.236 W
Width50%:	
Luminous Flux	1.897 klm

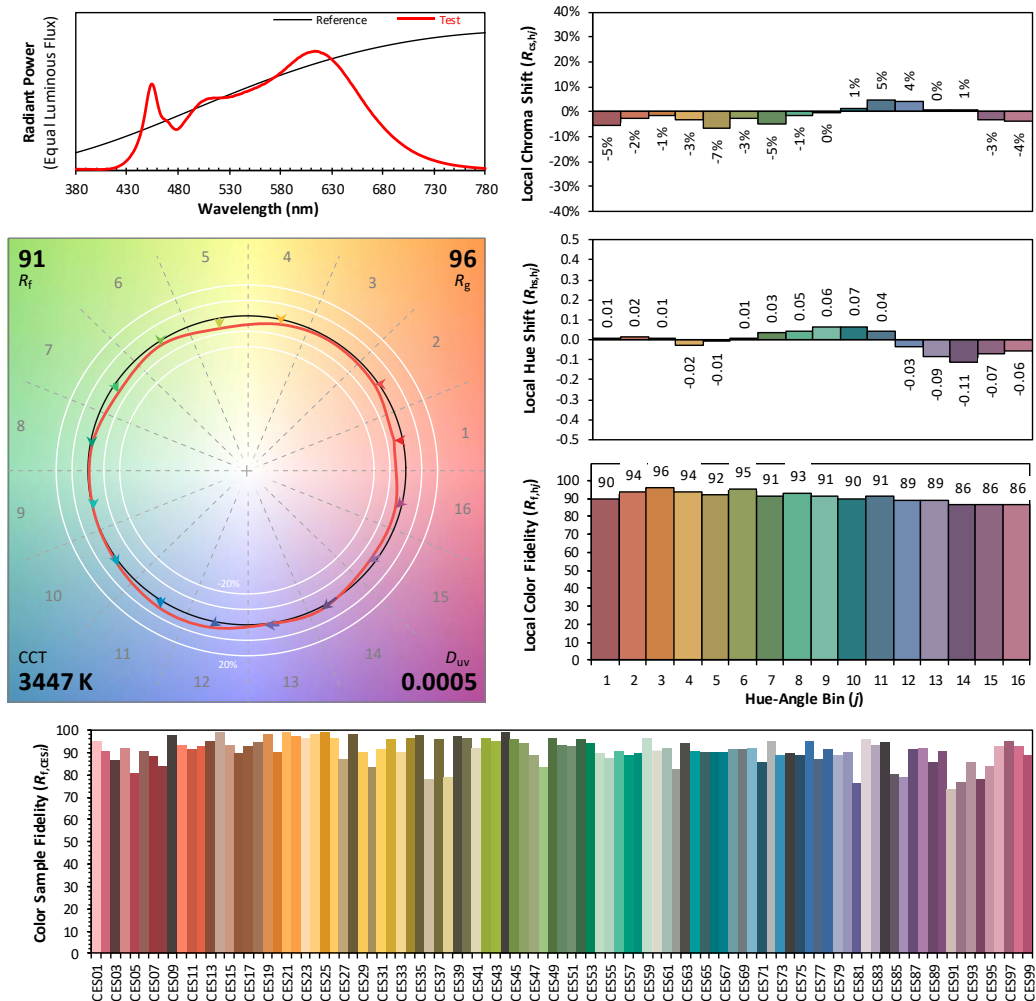
Color Coordinates

Correlated Color Temperature		3447 K	
x: 0.4089	u: 0.2368	u': 0.2368	
y: 0.3937	v: 0.3420	v': 0.5130	
CRI01	95.6	CRI09	58.6
CRI02	99.7	CRI10	99.5
CRI03	95.9	CRI11	98.1
CRI04	94.6	CRI12	83.1
CRI05	95.9	CRI13	97.3
CRI06	96.0	CRI14	98.2
CRI07	90.2	CRI15	90.2
CRI08	81.2	CRI16	86.1
ResultsCRI	93.6		



PlanckDistance 5.3E-004

4.1 Integrating Sphere Test



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

x **0.4089**
 y **0.3937**
 u' **0.2368**
 v' **0.5130**

CIE 13.3-1995
(CRI)

R_a 94
 R_g 58

lors 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 - 4000K

Model No.	L36T8_930_11G-XT	Sample ID.	B1
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	0.258	30.7	0.993

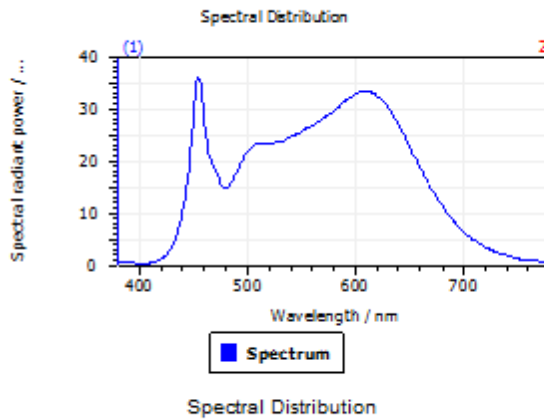
Test Result

CCT (K)	CRI	R9	Duv
3968	93	59	0.00013

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
90	96	-6%	1951	126.98

4.1 Integrating Sphere Test

Results

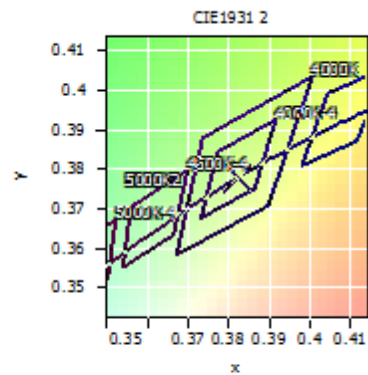


Spectral values

DominantWavelength	579.12 nm
Purity	0.281
PeakWavelength	454.43 nm
Radiant Power	6.402 W
Width50%:	
Luminous Flux	1.951 klm

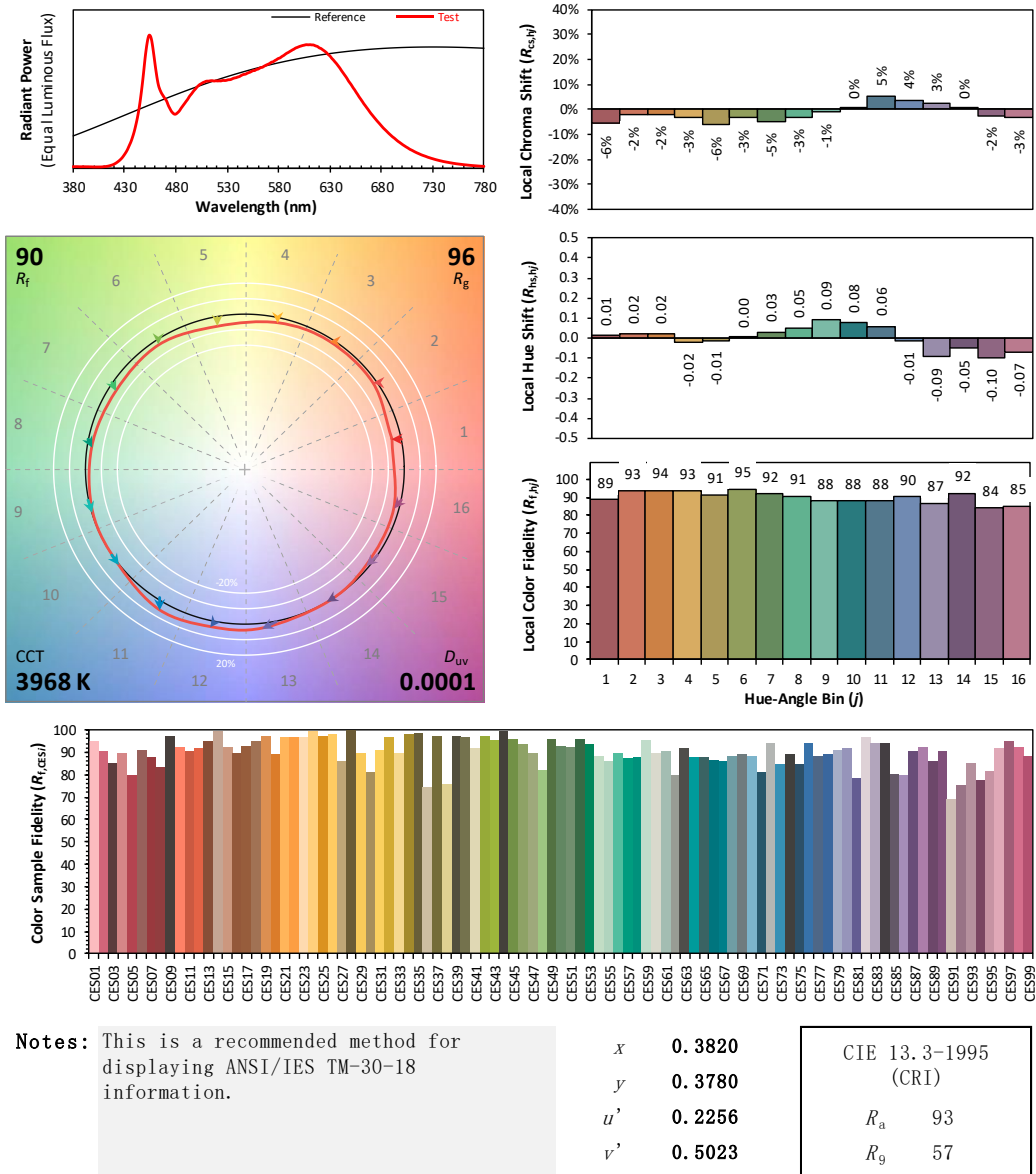
Color Coordinates

Correlated Color Temperatu		3968 K
x: 0.3820	u: 0.2256	u': 0.2256
y: 0.3780	v: 0.3349	v': 0.5023
CRI01	94.8	CRI09
CRI02	99.2	CRI10
CRI03	97.0	CRI11
CRI04	93.0	CRI12
CRI05	94.2	CRI13
CRI06	95.7	CRI14
CRI07	90.9	CRI15
CRI08	82.2	CRI16
ResultsCRI	93.4	



PlanckDistance 1.3E-004

4.1 Integrating Sphere Test



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4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 5000K

Model No.	L36T8_950_11G-XT	Sample ID.	B4
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
120.03	60	0.261	31.1	0.993

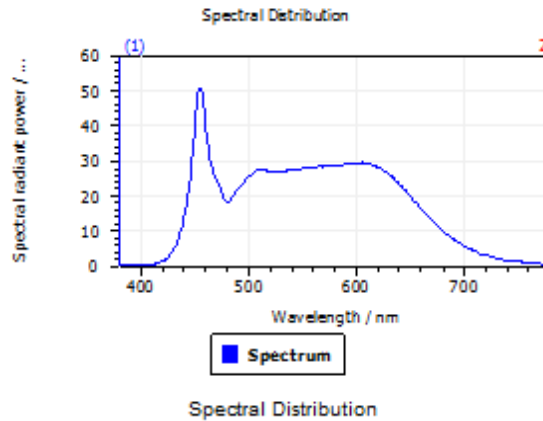
Test Result

CCT (K)	CRI	R9	Duv
5050	93	58	0.003

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
90	97	-6%	2004	128.87

4.1 Integrating Sphere Test

Results

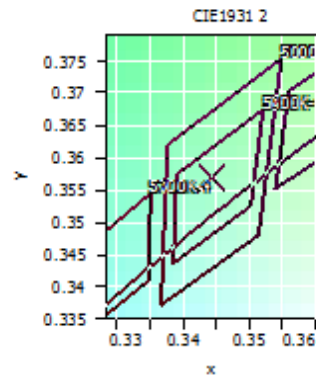


Spectral values

DominantWavelength	569.19 nm
Purity	0.105
PeakWavelength	454.67 nm
Radiant Power	6.707 W
Width50%:	
Luminous Flux	2.004 klm

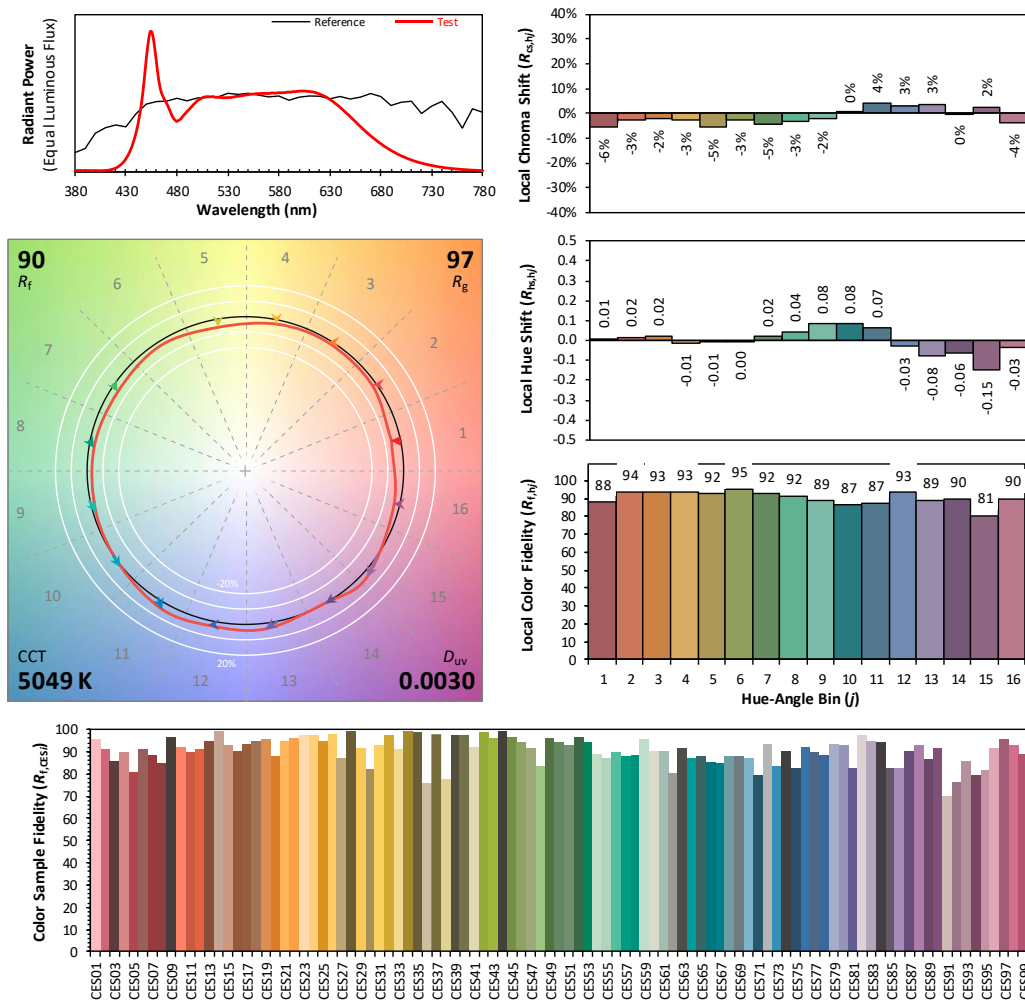
Color Coordinates

Correlated Color Temperatu		5050 K
x: 0.3443	u: 0.2088	u': 0.2088
y: 0.3570	v: 0.3248	v': 0.4872
CRI01	93.4	CRI09
CRI02	98.4	CRI10
CRI03	96.5	CRI11
CRI04	91.5	CRI12
CRI05	93.1	CRI13
CRI06	95.3	CRI14
CRI07	90.9	CRI15
CRI08	82.4	CRI16
ResultsCRI	92.7	



PlankDistance 3.0E-003

4.1 Integrating Sphere Test



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

x 0.3443
 y 0.3570
 u' 0.2088
 v' 0.4872

CIE 13.3-1995
(CRI)

R_a 93
 R_g 59

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

4.2 Goniophotometer Test - 3000K

Model No.	L36T8_930_11G-XT	Sample ID.	B1
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

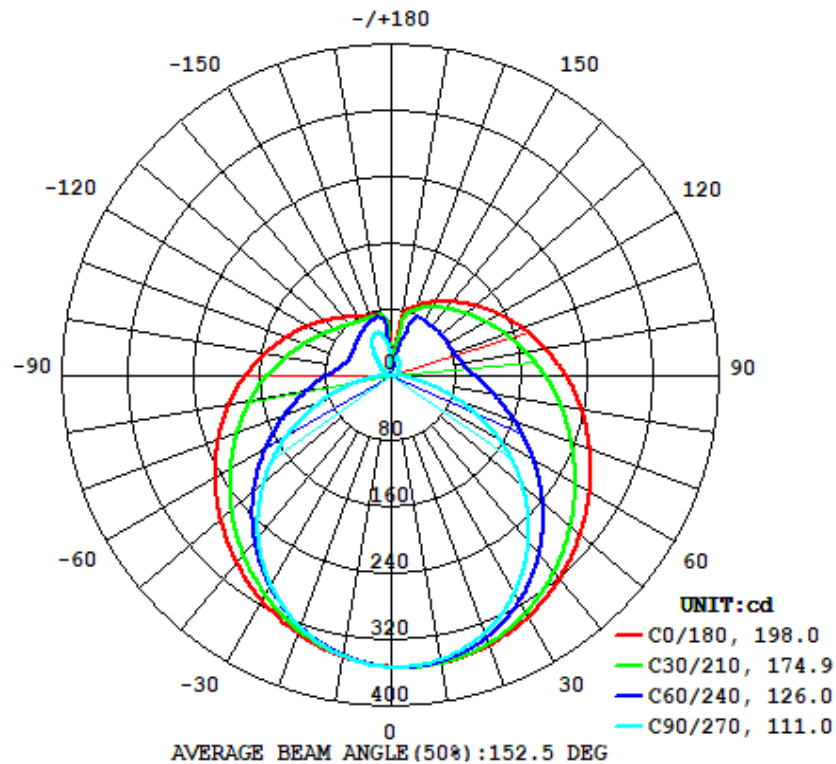
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WROST CASE	119.99	60	0.290	32.1	0.924

Test Result

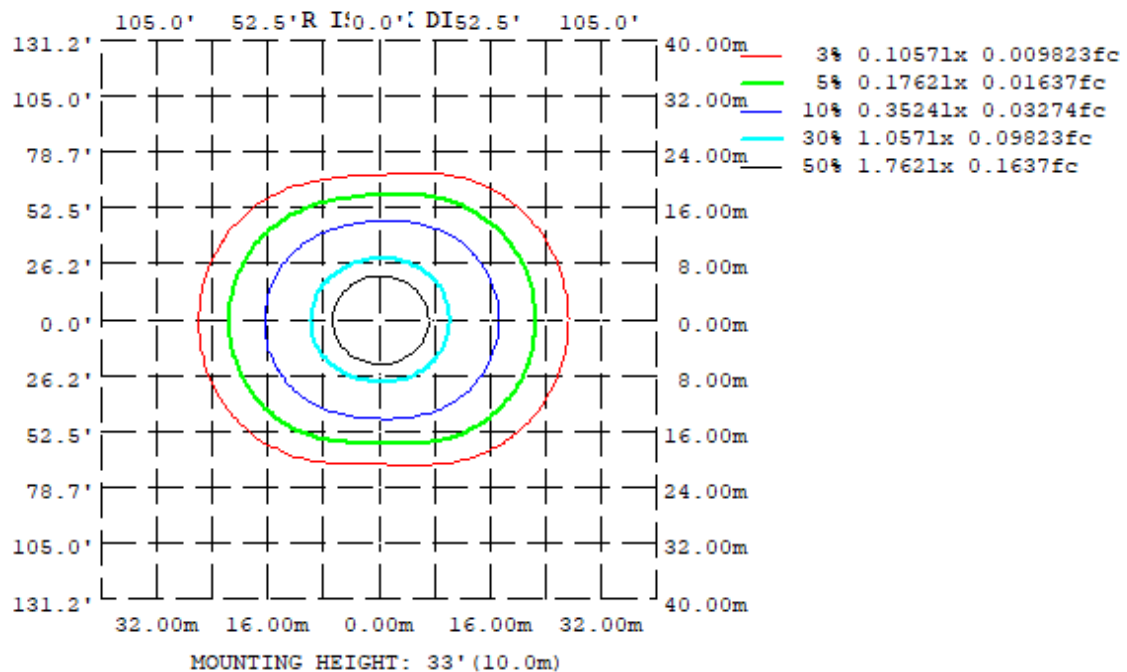
Flux (lm)	Luminous Efficacy (lm/W)	Beam Angle
1961	122.2	198.0

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 Φ lum, lm
10	353.1	352.0	348.3	346.6	345.4	343.6	344.4	349.4	0-10	33.43	33.43 1.7, 1.7
20	347.3	341.6	331.5	331.8	332.6	325.9	324.2	337.2	10-20	96.63	130.16, 6.3, 6.63
30	335.8	322.4	302.2	309.1	314.8	300.6	293.0	317.3	20-30	149.5	279.51, 4.3, 14.3
40	319.9	296.4	261.4	280.4	293.8	270.1	252.2	291.4	30-40	186.9	466.42, 3.8, 23.8
50	300.7	265.8	210.4	248.4	271.1	237.1	203.5	262.0	40-50	206.3	672.73, 4.3, 34.3
60	279.9	233.9	151.4	215.9	247.6	204.0	149.0	231.8	50-60	208.1	880.74, 4.9, 44.9
70	257.9	203.5	87.84	184.9	224.0	172.9	91.48	203.1	60-70	194.9	1076.54, 9.5, 54.9
80	235.8	176.9	28.33	157.3	200.7	145.1	36.45	177.8	70-80	172.0	1248.63, 6.6, 63.6
90	213.8	154.9	0.4488	133.6	178.4	121.8	2.456	156.1	80-90	146.5	1394.71, 1.1, 71.1
100	192.1	137.0	3.481	114.2	157.3	103.1	1.302	137.8	90-100	125.2	1519.77, 5.7, 77.5
110	171.4	122.5	11.65	98.84	137.6	88.98	7.838	123.2	100-110	108.0	1627 83, 83
120	151.7	110.9	13.16	87.97	119.9	79.55	6.569	111.2	110-120	92.34	1720.87, 7.7, 87.7
130	133.6	102.0	13.97	80.91	104.8	74.13	16.53	101.6	120-130	77.38	1797.91, 7.9, 91.7
140	117.4	94.95	18.27	76.98	92.46	71.83	28.09	91.74	130-140	63.15	1860.94, 9.9, 94.9
150	103.3	88.29	22.47	74.99	83.50	72.07	46.87	85.63	140-150	48.45	1909.97, 4.9, 97.4
160	88.11	82.16	25.70	74.43	77.81	73.70	55.25	80.97	150-160	32.33	1941 99, 99
170	48.18	4.648	13.98	71.28	75.10	74.48	46.42	1.115	160-170	16.54	1958.99, 8.9, 99.8
180	0.4441	11.98	18.64	6.567	0.6887	20.61	19.79	15.57	170-180	3.045	1961 100, 100
DEG	LUMINOUS INTENSITY:cd									UNIT: lm	

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	L36T8_930_11G-XT	Sample ID.	B1
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	0.270	32.2	0.993	8.40%
277.01	60	0.128	32.0	0.903	11.31%

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*****