



Photometric Test Report

Relevant Standards

- IES LM-79-2008
- ANSI C82.77:2014

Prepared For RAB LIGHTING INC

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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 v4.4

Linear Replacement Lamps - Replacement Lamps ("Plug and Play") (UL Type C)				
Requirement Category	Test Method	Requirements	Test value	Results (Fail/Pass)
Bare Lamp				
Lamp Output for bare lamp (lm)	IES LM-79-2008	≥ 1200	1663	P
		≥ 1200	1723	P
Minimum Lamp Efficacy (lm/W)	IES LM-79-2008	≥ 110	126.2	P
		≥ 110	131.6	P
Allowable CCTs* (K)	IES LM-79-2008	3045 \pm 175	3049	P
		5029 \pm 283	5131	P
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥ 80	81.8	P
		≥ 80	84.2	P
Power Factor	ANSI C82.77:2014	≥ 0.9	-	P
		≥ 0.9	0.945	P
Total Harmonic Distortion (A%)	ANSI C82.77:2014	$\leq 25\%$	-	P
		$\leq 25\%$	10.02%	P
in Fixture				
Lamp Output (lm)	IES LM-79-2008	≥ 2200	3109	P
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	≥ 100	119.2	P
Zonal Lumen Requirement(0°-60°)	IES LM-79-2008	$\geq 40\%$	54.01%	P

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2019/9/11	T8-11-36G-830-EXT	A1
			T8-11-36G-850-EXT	A3
2	Goniophotometer Test	2019/9/11	T8-11-36G-830-EXT	A1-A2
3	THD and PF Test	2019/9/11	T8-11-36G-830-EXT	A1

Remark(If any)

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3.0 Production Description

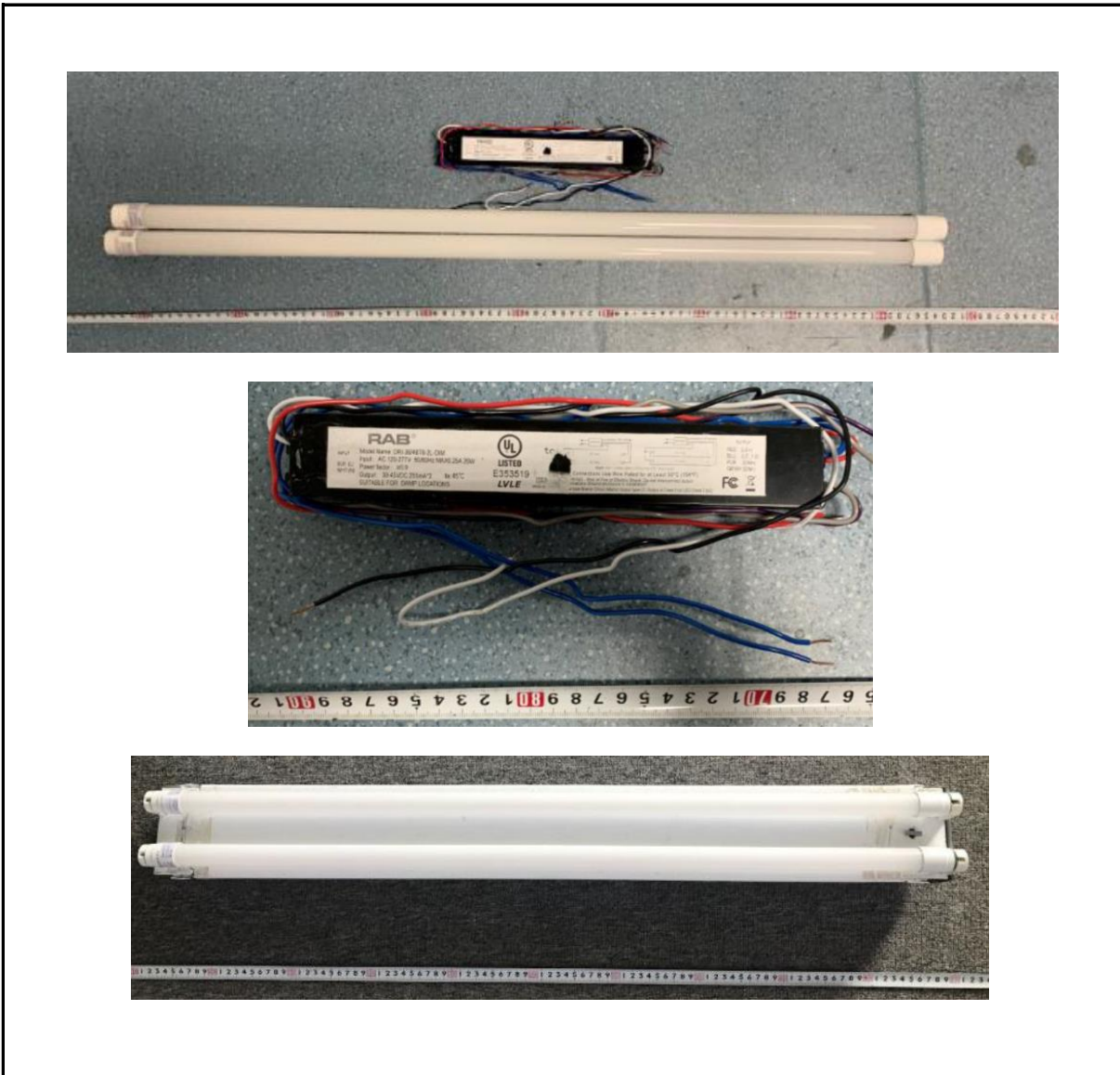
Luminaire Description: T8-11-36G-830-EXT/T8-11-36G-850-EXT

Electrical Specification: 120V-277V,60HZ,14W

Test in fixture: Columbia CS3-225 EU

Test with LED Driver: DRI-36/48T8-2L-DIM

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	T8-11-36G-830-EXT	Sample ID.	A1
Model No.	T8-11-36G-850-EXT	Sample ID.	A3
Operate time (Min.)	90	Stabilization time (Min.)	45

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.

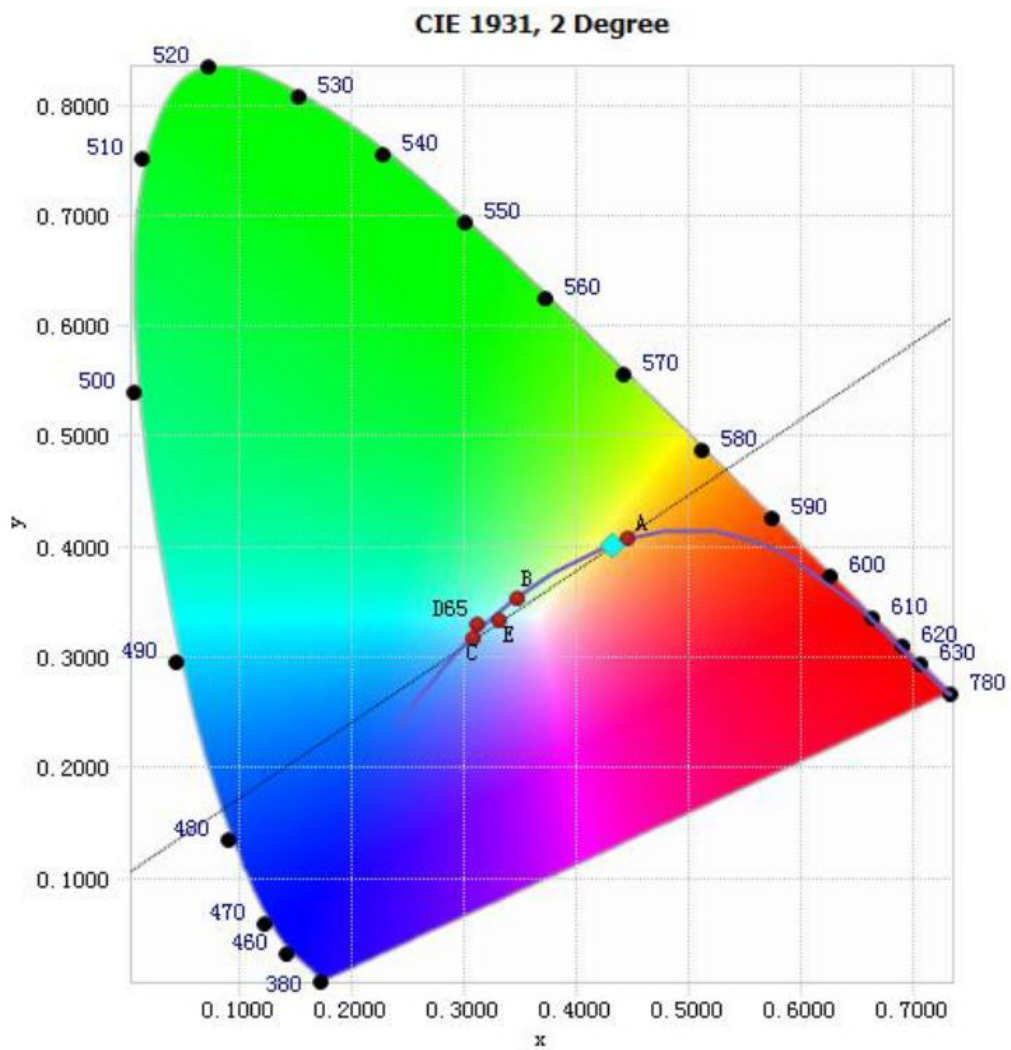
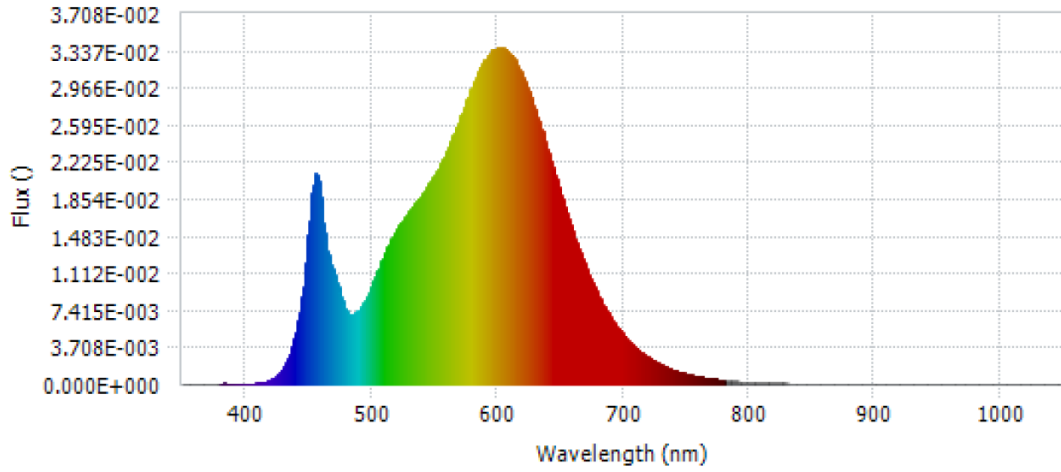
Test Conditions

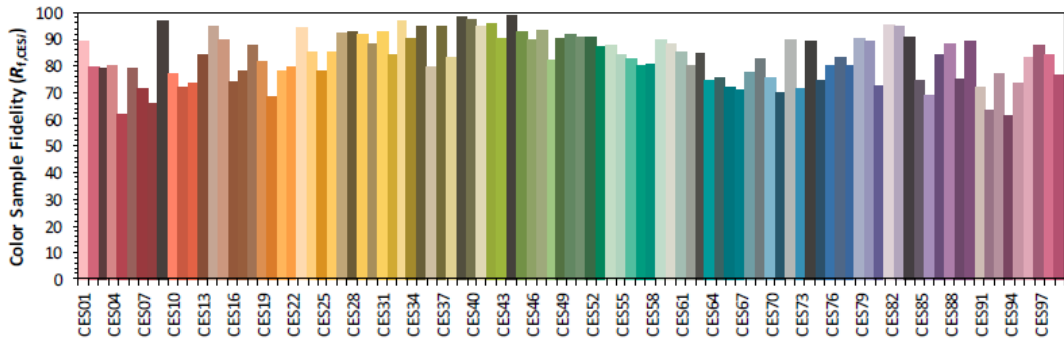
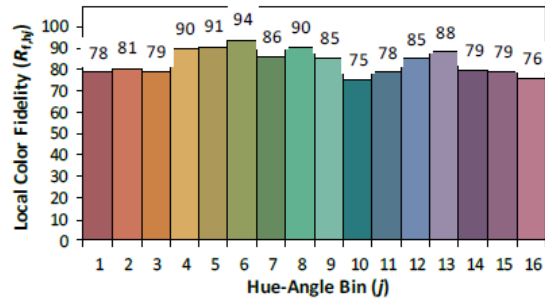
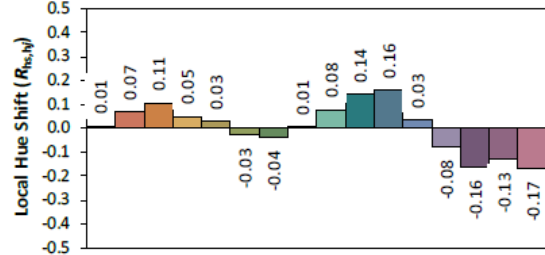
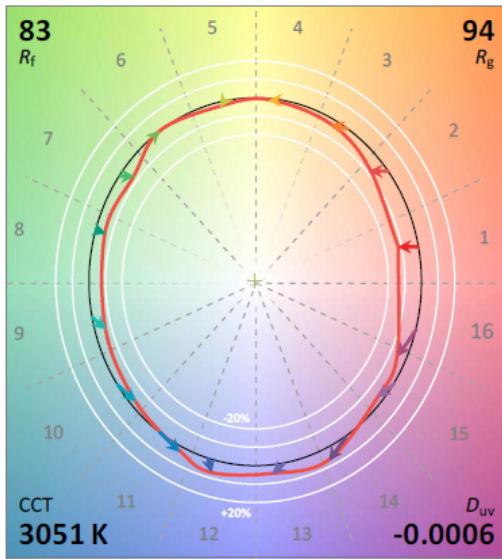
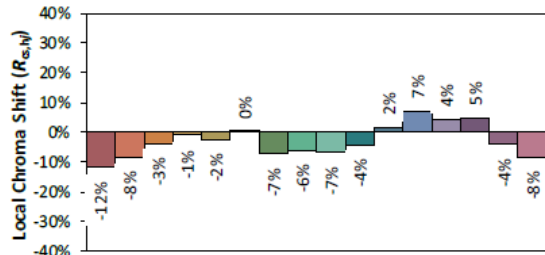
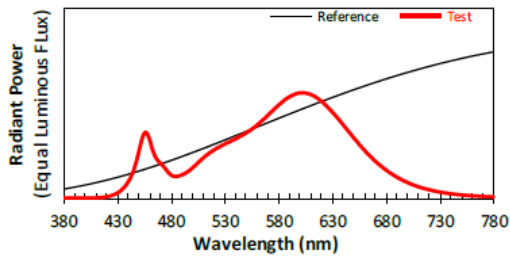
Model No.	Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
T8-11-36G-830-EXT	25.1	120.00	60	0.110	13.17	0.997
T8-11-36G-850-EXT	25.1	120.00	60	0.109	13.09	0.997

Test Result

Model No.	CCT (K)	CRI (Ra)	Light Output (lm)	Efficacy (lm/W)	Duv
T8-11-36G-830-EXT	3049	81.8	1663	126.2	-6.0E-04
T8-11-36G-850-EXT	5131	84.2	1723	131.6	1.9E-03

4.1 Integrating Sphere Test
T8-11-36G-830-EXT





4.1 Integrating Sphere Test
 T8-11-36G-850-EXT

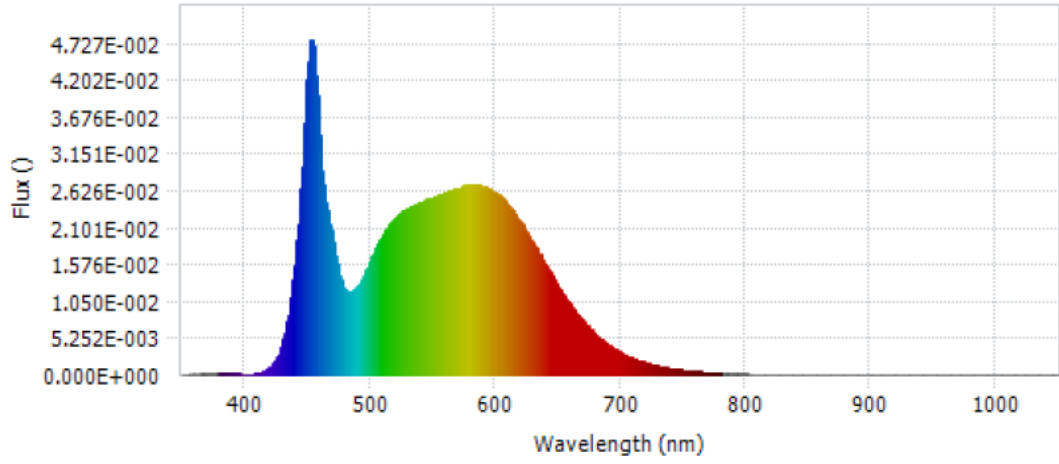
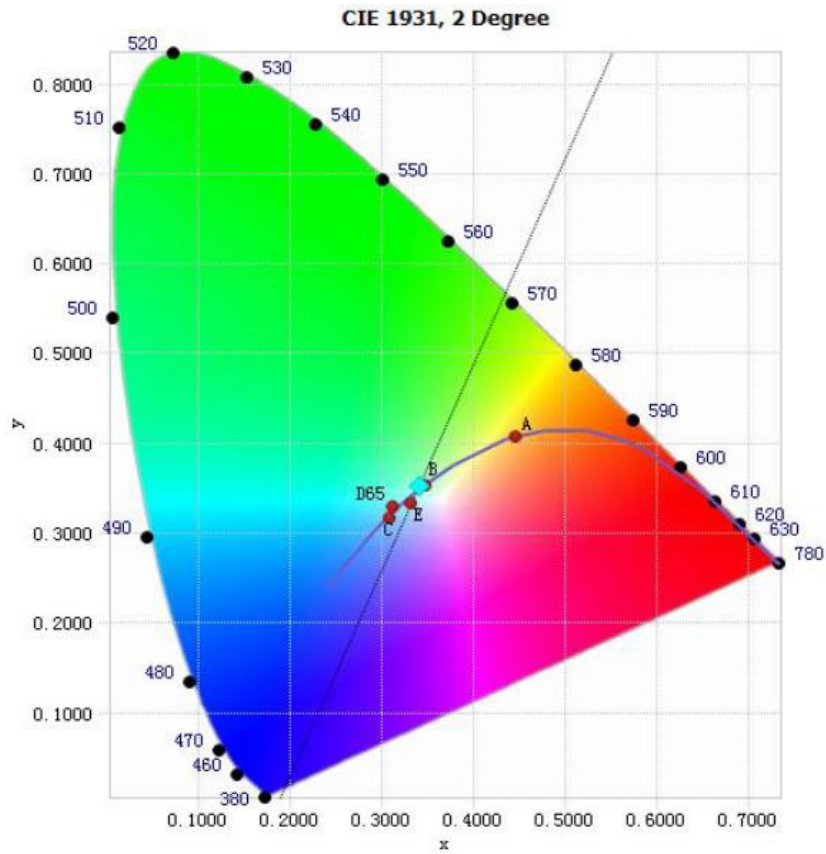
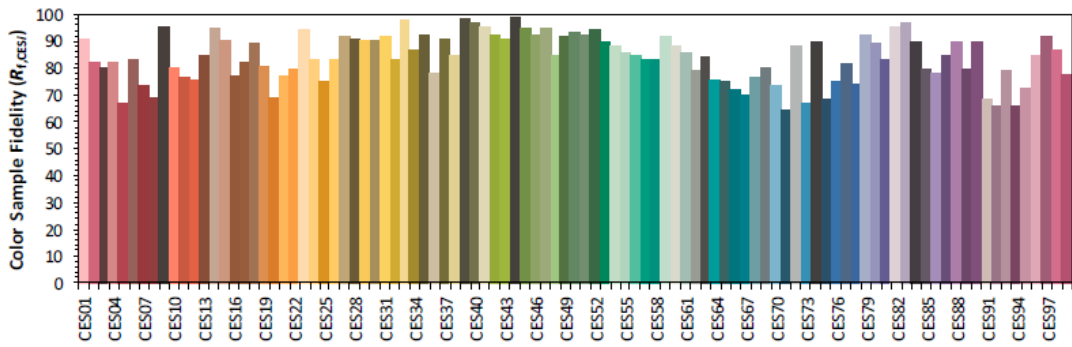
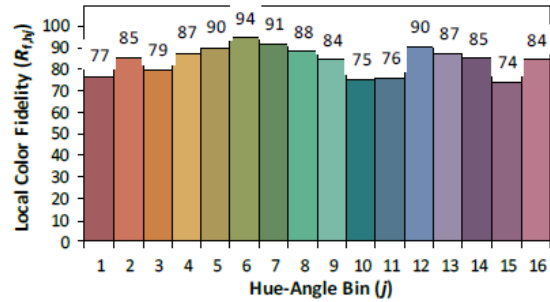
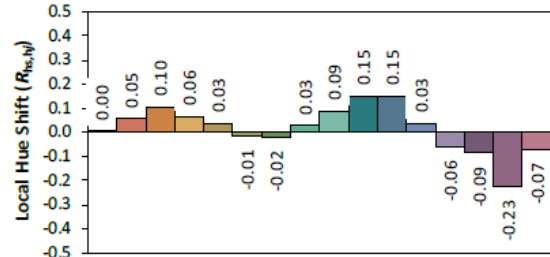
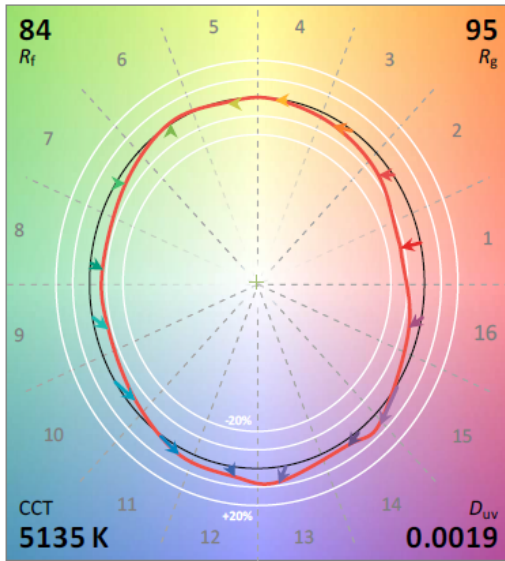
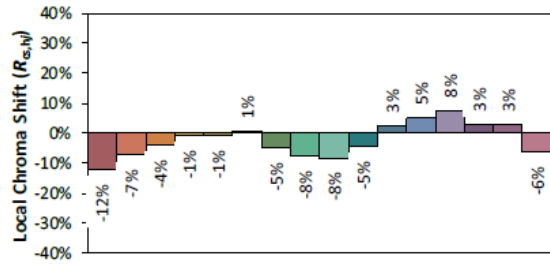
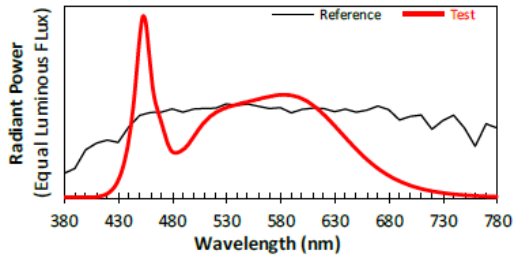


Chart 1: Spectral Power Distribution



Tristimulus values(x, y): (0.3417, 0.3525)

Chart 2: Chromaticity Diagram per Sphere - Spectroradiometer Method



4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	T8-11-36G-830-EXT	Sample ID.	A1-A2
Operate time (Min.)	90	Stabilization time (Min.)	45

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

Two tubes were placed in a reference housing during testing

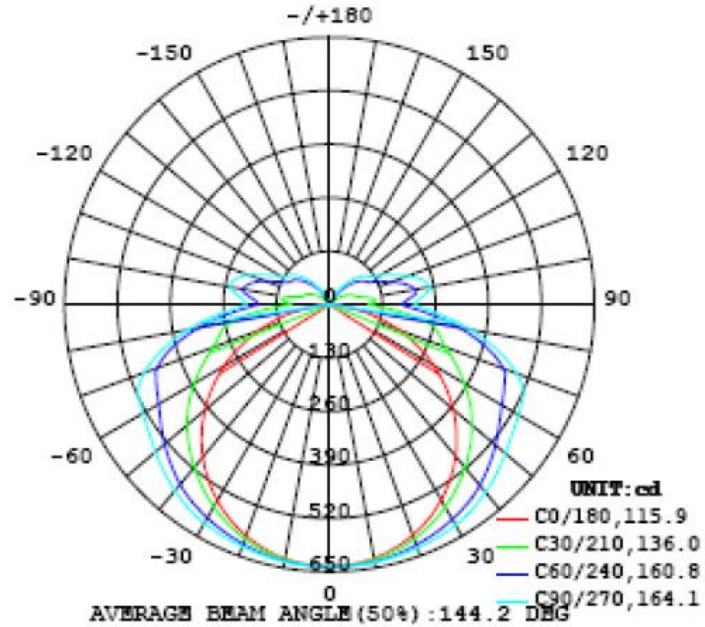
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Power (W)	Orientation
25.10	120.00	60	26.09	Light Down

Test Result

Flux(lm)	Zonal Lumen Requirement (0° - 60°)	SC (0° - 180°)	SC (90° - 270°)	Luminous Efficacy (lm/W)
3109	54.01%	1.29	1.46	119.2

4.3 Goniophotometer Test

Light Distrubtion Curve



4.3 Goniophotometer Test

$\gamma(^{\circ})$	T8-11-36G-830-EXT	
	2 tubes in Columbia CS3-225 EU	
	Lumens	% Total
0- 10	60.546	1.95%
10- 20	176.509	5.68%
20- 30	277.227	8.92%
30- 40	354.255	11.40%
40- 50	399.494	12.85%
50- 60	410.932	13.22%
60- 70	395.575	12.72%
70- 80	334.859	10.77%
80- 90	206.748	6.65%
90-100	153.388	4.93%
100-110	138.332	4.45%
110-120	91.141	2.93%
120-130	59.123	1.90%
130-140	34.631	1.11%
140-150	13.675	0.44%
150-160	2.015	0.06%
160-170	0.222	0.01%
170-180	0.075	0.00%
Total	3108.7	100%

5.0 THD and PF Test

Model No.	T8-11-36G-830-EXT	Sample ID.	A1
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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

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Power Factor	THD
25.1	277.00	60	0.945	10.02%

6.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2018/12/26	2019/12/25
DLF108	Auxiliary Lamp	2018/12/26	2019/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2018/12/26	2019/12/25
DLF116	AC Power Source	2018/12/26	2019/12/25
DLF113	Power Meter	2018/12/26	2019/12/25
DLF112	Temperature Recorder	2018/12/26	2019/12/25
DLF114	Temperature & Humidity Datalogger	2018/12/26	2019/12/25
DLF101	Goniophotometer	2018/12/26	2019/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2018/12/26	2019/12/25
DLF104	AC Power Source	2018/12/26	2019/12/25
DLF507	DC Power Source	2018/12/26	2019/12/25
DLF102	Power Meter	2018/12/26	2019/12/25
DLF111	Temperature & Humidity Datalogger	2018/12/26	2019/12/25
DLF119	Power Meter	2018/12/26	2019/12/25
DLF031	Temperature data logger	2018/12/26	2019/12/25
DLF022	Digital power meter	2018/12/26	2019/12/25
DLF003	Temperature & Humidity Datalogger	2018/12/26	2019/12/25

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