



Photometric Test Report

Relevant Standards

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

Prepared For RAB LIGHTING INC

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1.0 Test Summary

DLC Technical Requirements v4.4

Linear Replacement Lamps - Replacement Lamps ("Plug and Play") (UL Type A+B)				
Requirement Category	Test Method	Requirements	Test value	Results (Fail/Pass)
Bare Lamp (Type A)				
Lamp Output for bare lamp (lm)	IES LM-79-2008	≥1600	1711	P
		≥1600	1754	P
Minimum Lamp Efficacy (lm/W)	IES LM-79-2008	≥110	126.6	P
		≥110	130.0	P
Allowable CCTs* (K)	IES LM-79-2008	3465±245	3064	P
		5029±283	5059	P
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥80	81.5	P
		≥80	82.5	P
Power Factor	ANSI C82.77:2014	≥0.9	0.997	P
		≥0.9	0.954	P
Total Harmonic Distortion (A%)	ANSI C82.77:2014	≤20%	4.57%	P
		≤20%	13.93%	P
Bare Lamp (Type B)				
Lamp Output for bare lamp (lm)	IES LM-79-2008	≥1600	1980	P
		≥1600	2036	P
Minimum Lamp Efficacy (lm/W)	IES LM-79-2008	≥110	150.0	P
		≥110	154.6	P
Allowable CCTs* (K)	IES LM-79-2008	3465±245	3068	P
		5029±283	5059	P
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	≥80	81.3	P
		≥80	82.3	P
Power Factor	ANSI C82.77:2014	≥0.9	0.976	P
		≥0.9	0.917	P
Total Harmonic Distortion (A%)	ANSI C82.77:2014	≤20%	20.98%	P
		≤20%	20.97%	P
in Fixture (Type A)				
Lamp Output (lm)	IES LM-79-2008	≥3000	2808	P
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	≥100	103.3	P
Zonal Lumen Requirement(0°-60°)	IES LM-79-2008	≥75%	81.33%	P
SC (0°-180°)	IES LM-79-2008	1.0-2.0	1.24	P
SC (90°-270°)	IES LM-79-2008	1.0-2.0	1.29	P

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2019/7/11	T8-12-48G-830-HYB	L1
			T8-12-48G-850-HYB	L3
2	Goniophotometer Test	2019/7/11	T8-12-48G-830-HYB	L1-L2
3	THD and PF Test	2019/7/11	T8-12-48G-830-HYB	L1

Remark(If any)

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3.0 Production Description

Luminaire Description: T8-12-48G-830-HYB / T8-12-48G-850-HYB

Electrical Specification: 120V-277V,50/60HZ

Test in fixture: Lithonia 2GT8 lensed 2x4

Type A Test Ballast: QTP 3x32T8/UNV ISN-SC

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test (Type A)

Model No.	T8-12-48G-830-HYB	Sample ID.	L1
Model No.	T8-12-48G-850-HYB	Sample ID.	L3
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.

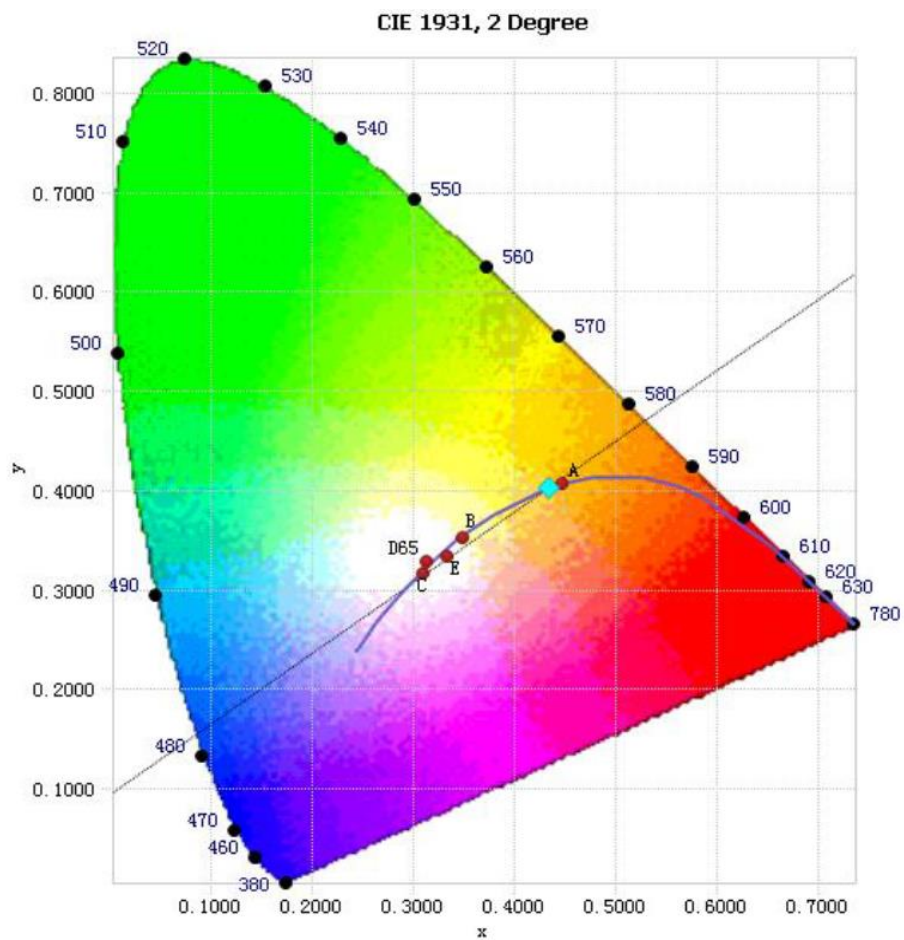
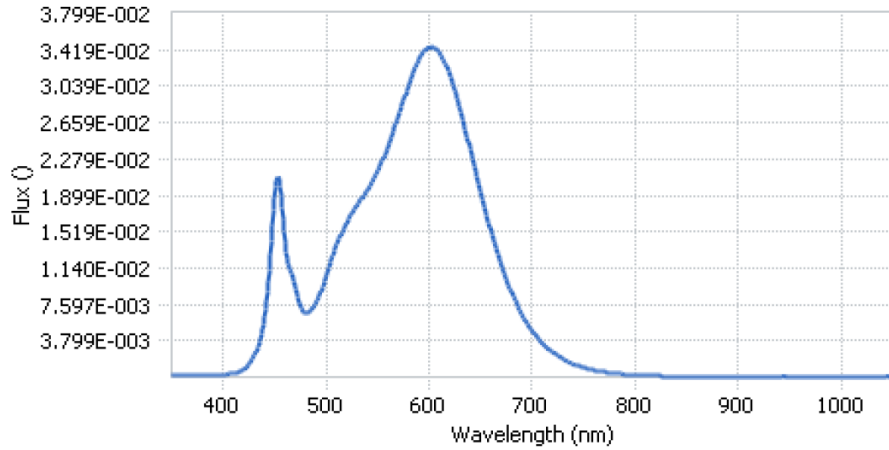
Test Conditions

Model No.	Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
T8-12-48G-830-HYB	25.1	120.00	60	0.113	13.51	0.997
T8-12-48G-850-HYB	25.1	120.00	60	0.113	13.49	0.997

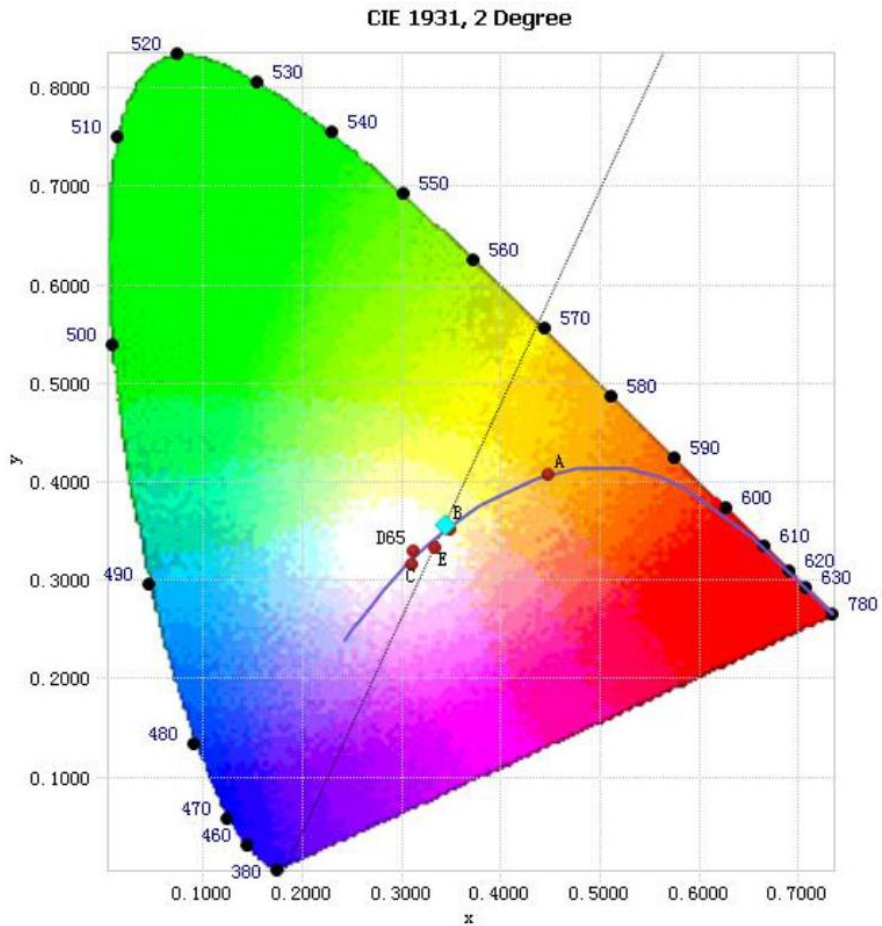
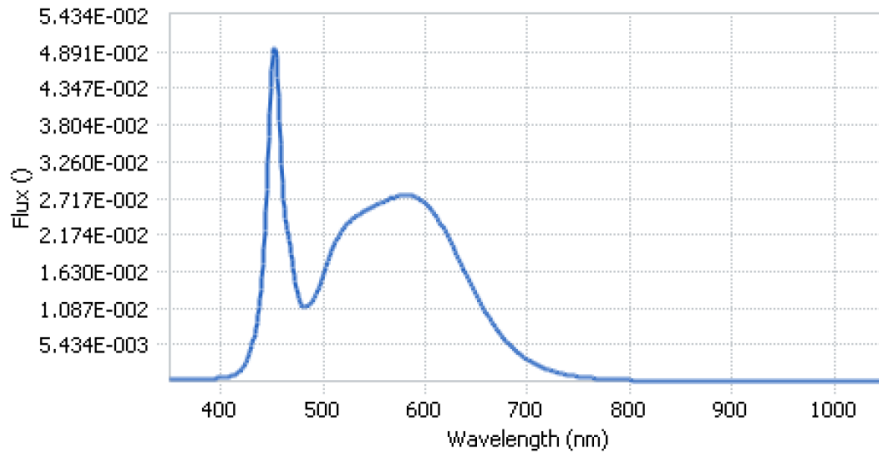
Test Result

Model No.	CCT (K)	CRI (Ra)	Light Output (lm)	Efficacy (lm/W)	Duv
T8-12-48G-830-HYB	3064	81.5	1711	126.6	5.0E-04
T8-12-48G-850-HYB	5059	82.5	1754	130.0	2.0E-03

4.1 Integrating Sphere Test
T8-12-48G-830-HYB



4.1 Integrating Sphere Test
T8-12-48G-850-HYB



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test (Type B)

Model No.	T8-12-48G-830-HYB	Sample ID.	L1
Model No.	T8-12-48G-850-HYB	Sample ID.	L3
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.

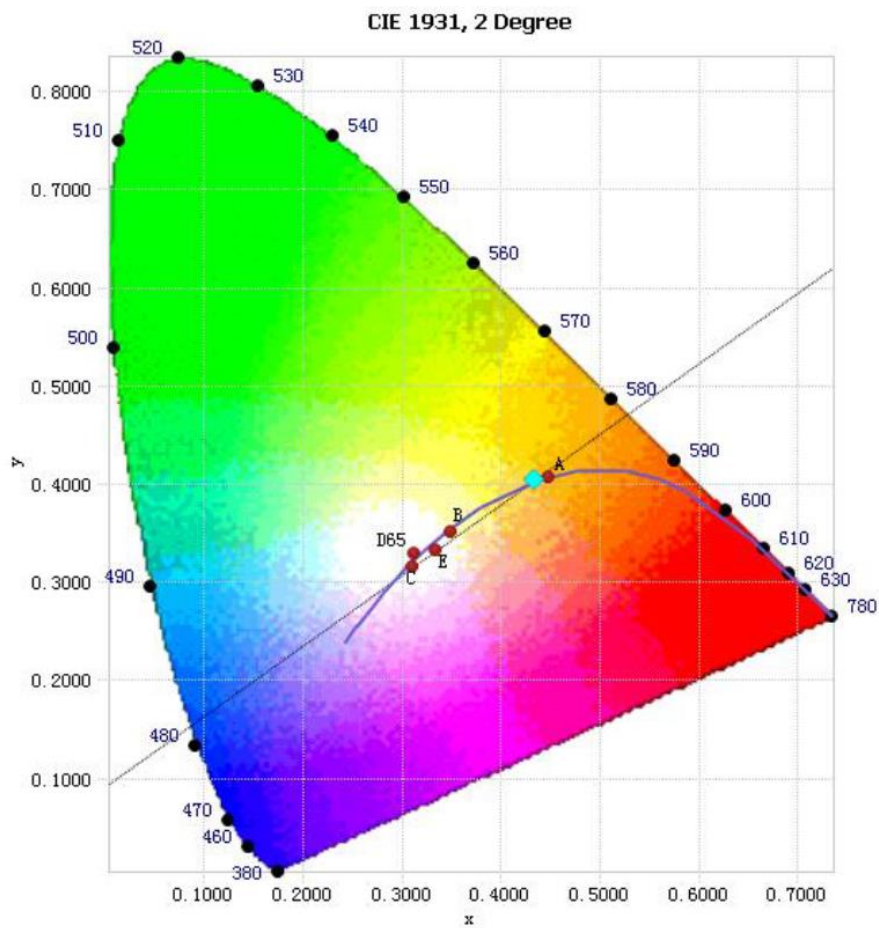
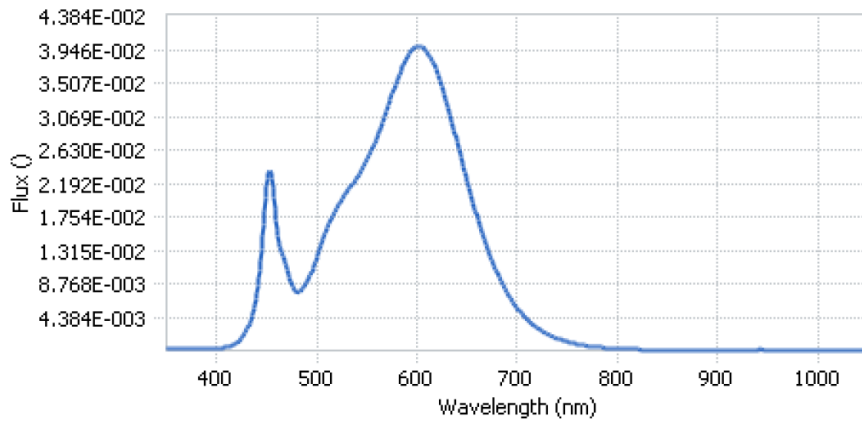
Test Conditions

Model No.	Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
T8-12-48G-830-HYB	25.1	120.00	60	0.113	13.20	0.976
T8-12-48G-850-HYB	25.1	120.00	60	0.112	13.17	0.976

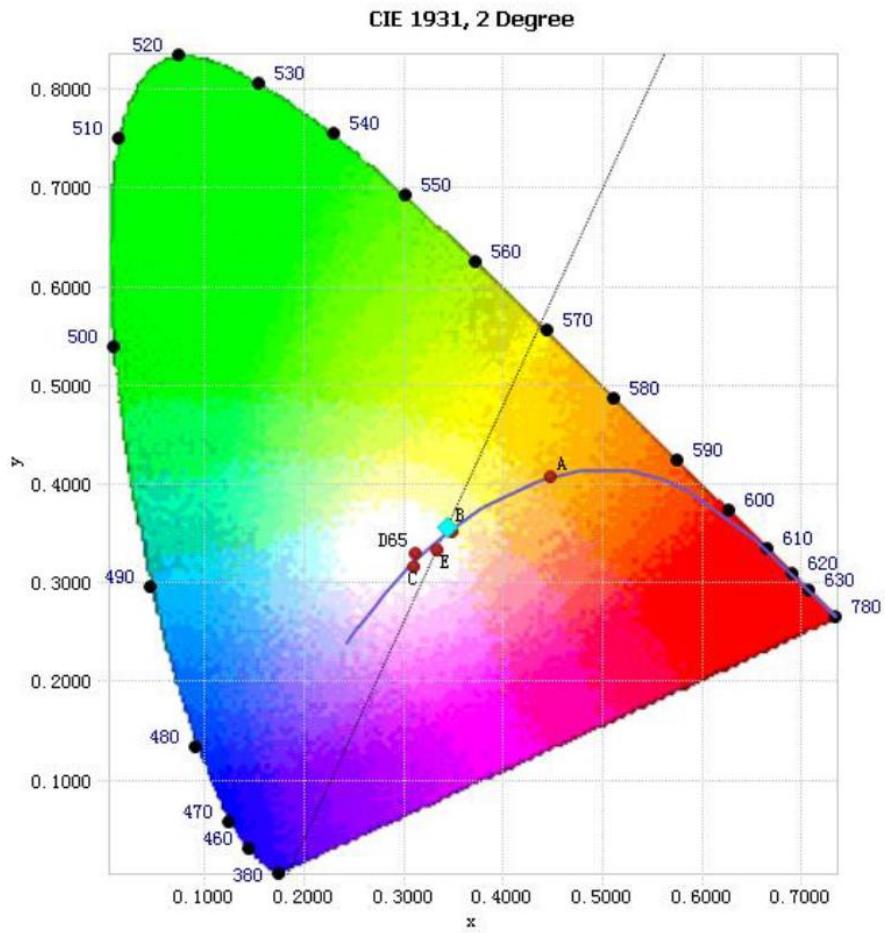
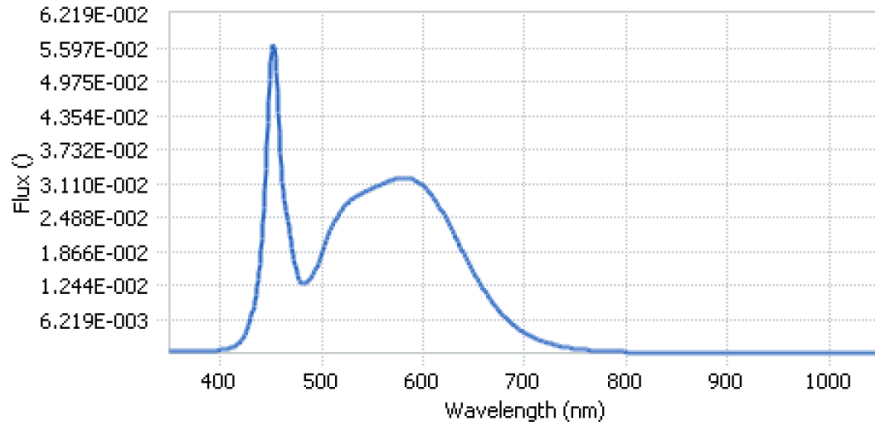
Test Result

Model No.	CCT (K)	CRI (Ra)	Light Output (lm)	Efficacy (lm/W)	Duv
T8-12-48G-830-HYB	3068	81.3	1980	150.0	7.0E-04
T8-12-48G-850-HYB	5059	82.3	2036	154.6	2.1E-03

4.1 Integrating Sphere Test
 T8-12-48G-830-HYB



4.1 Integrating Sphere Test
 T8-12-48G-850-HYB



4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	T8-12-48G-830-HYB	Sample ID.	L1-L2
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

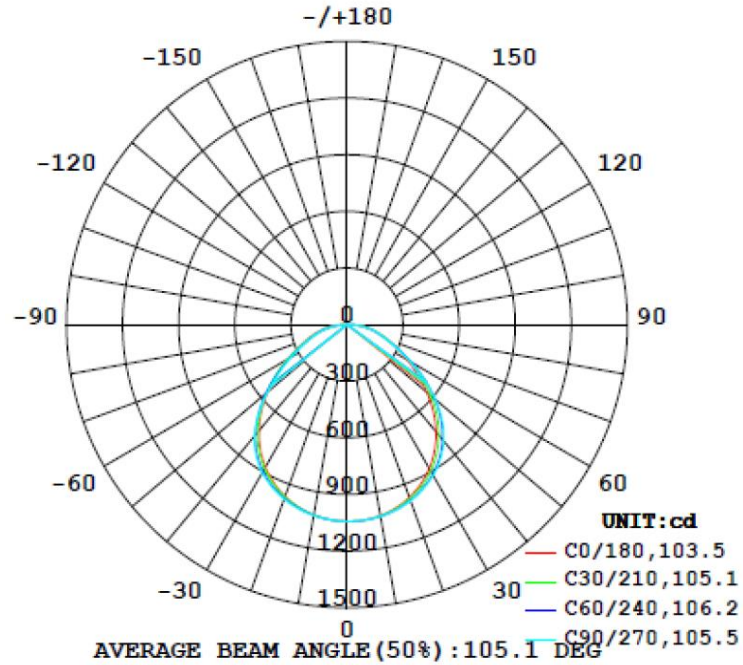
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Power (W)	Orientation
25.10	120.00	60	27.19	Light Down

Test Result

Flux(lm)	Zonal Lumen Requirement(0° - 60°)	SC (0° - 180°)	SC (90° - 270°)	Luminous Efficacy (lm/W)
2808	81.33%	1.24	1.29	103.3

4.3 Goniophotometer Test

Light Distribution Curve



4.3 Goniophotometer Test

Zonal Lumen Summary

$\gamma(^{\circ})$	T8-72-48G-835-HYB	
	2 tubes in Lithonia 2GT8 lensed 2x4	
	Lumens	% Total
0- 10	98.839	3.52%
10- 20	284.692	10.14%
20- 30	434.676	15.48%
30- 40	522.741	18.62%
40- 50	520.098	18.52%
50- 60	422.958	15.06%
60- 70	285.841	10.18%
70- 80	172.712	6.15%
80- 90	60.496	2.15%
90-100	0.696	0.02%
100-110	0.788	0.03%
110-120	0.712	0.03%
120-130	0.728	0.03%
130-140	0.701	0.02%
140-150	0.611	0.02%
150-160	0.464	0.02%
160-170	0.3	0.01%
170-180	0.105	0.00%
Total	2808.2	100%

5.0 THD and PF Test

Model No.	T8-12-48G-830-HYB	Sample ID.	L1
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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° C ± 1° 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 (Type A)

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Power Factor	THD
25.1	120.00	60	0.997	4.57%
25.1	277.00	60	0.954	13.93%

Test Results (Type B)

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Power Factor	THD
25.1	120.00	60	0.976	20.98%
25.1	277.00	60	0.917	20.97%

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*****