IESNA LM79-2008 Test Report

TÜV SÜD America

Photometric Testing and Evaluation in Accordance with LM79-2008

Report Prepared for:

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Sample Tested:	**GTSOL50-PAR38-WW-MFL**
Description:	**LED PAR38 Lamp Module**
Manufacturer:	**Global Tech LED LLC**
Technical Report Number:	**72106528-02-LM79**
Report Issue Date:	**June 30th, 2015**
Total Number of Pages:	**8** (including this page)

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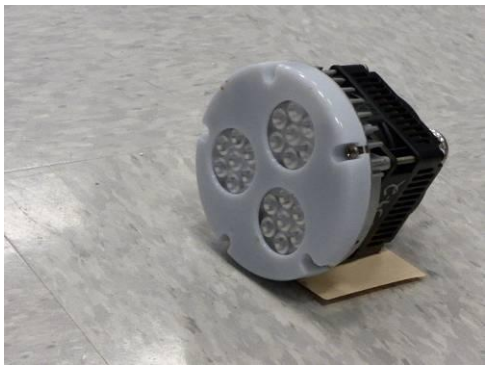
Summary of Key Test Results

Model#	**GTSOL50-PAR38-WW-MFL**
Manufacturer	**Global Tech LED LLC**
TÜV Sample#	1939-2
Date of Test	June 30, 2015



Notes:
Tested in FBU orientation (Fixture Base Up)
THIS IS A TEST OF THE NEW GTSOL50 AC DRIVEN LAMP W/50 DEGREE LENS

Parameter	Measured Result
Luminous Flux	**2,711 Lumens**
Input Power	**43.04 Watts**
Efficacy	**62.99 Lumens/Watt**
C.C.T.	**2711 K**
C.R.I. (R_a)	**83.6**
Beam Angle	**45.5° (V) / 39.1° (H)**
Stabilization Time	**30 minutes**
In-Situ Temp Test (ISTMT)**	**Not tested**

The above results are recorded / derived from measurements in accordance with LM79-08

**ISTMT in accordance with "Energy Star Program Requirements for Luminaires – Version 1.2".

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Test Results –

The following results were obtained after stabilization of the sample in accordance with the requirements set forth in section 5.0 of IES LM79-2008. Stability is achieved when the variation of 3 readings of light output and electrical power over a period of 30 minutes, taken 15 minutes apart, is less than 0.5%.

Photometric Results	GTSOL50-PAR38-WW-MFL	
	Integrating Sphere	
Total Luminous Flux (Lumens)	2,711.0	
Luminous Efficacy (Lumens/Watt)	62.99	
Correlated Color Temperature (CCT)	2711	
Color Rendering Index (CRI – R_a)	83.6	
R_9 Value	19.8	
Total Radiant Flux (Watts)	9.0	
Chromaticity (Chroma x / Chroma y)	0.4575	0.4079
Chromaticity (Chroma u / Chroma v)	0.2621	0.3506
Chromaticity (Chroma u' / Chroma v')	0.2621	0.5260
D_{uv} Value	-0.00075	

Electrical Results	GTSOL50-PAR38-WW-MFL	
	Integrating Sphere (120V / 277V)	
Input Power (Watts)	43.04	45.20
Input Voltage (Volts AC)	120.07	277.02
Input Current (Amps)	0.395	0.180
Power Factor	0.928	0.905
A-THD (Current %)	31.10	37.40
Input Frequency (Hertz)	60.0	60.0

Additional Parameters	GTSOL50-PAR38-WW-MFL	
	Integrating Sphere	Goniophotometer
Stabilization Time (Light and Power)	30 minutes	30 minutes
Test Geometry Configuration	4π	Type C
Ambient Temperature	25°C	24.1°C
ISTMT (In-Situ Temperature Measurement)	Not Tested	
Spacing Criteria	N/A	

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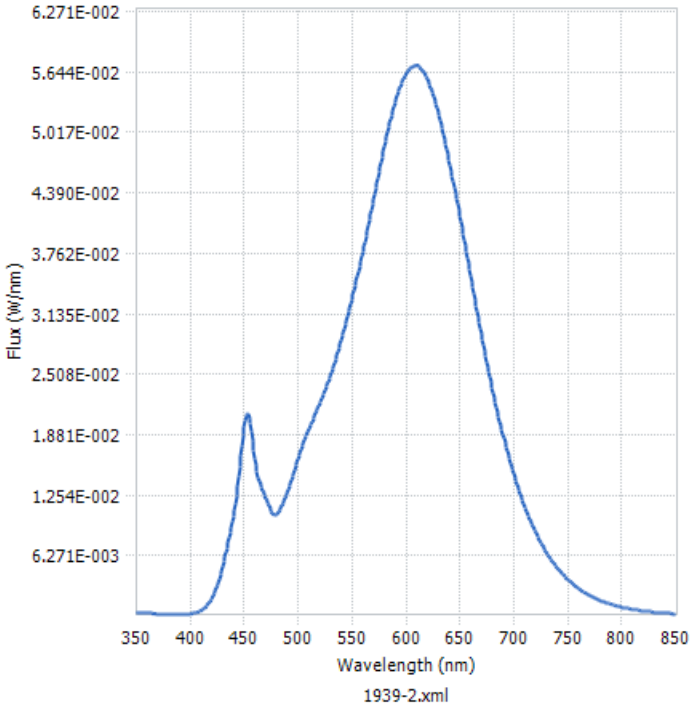
Spectral Flux and Chromaticity Diagram

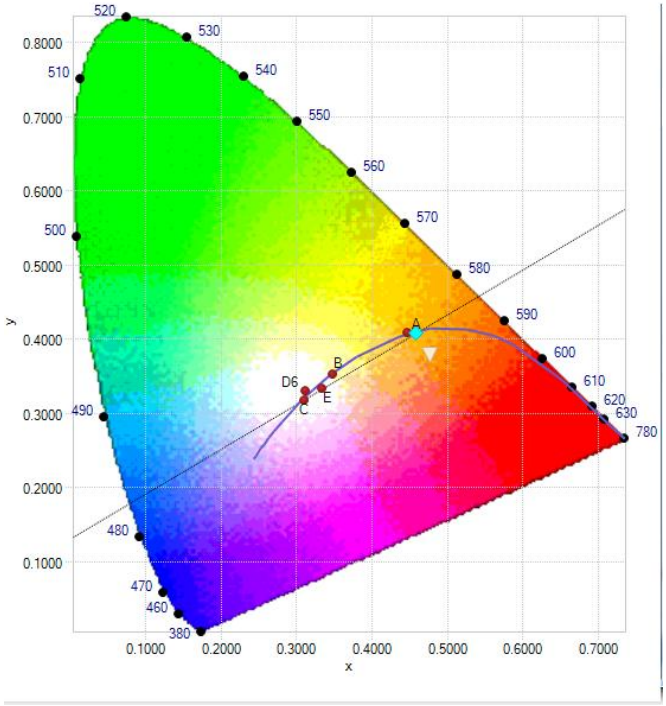
Spectral Flux



Spectral response of the Radiant Flux

(350nm to 850nm)

Chromaticity Diagram



Tristimulus values (from page 4):

x / y = 0.4575 / 0.4079

The locations on the diagram of the tristimulus coordinates are indicated by the blue diamond.

Zonal Lumen Summary

Zone	Lumens	% Lamp / Luminaire
0-40	2,389.70	91.80%
0-60	2,555.80	98.20%
60-90	47.3	1.80%
0-90	2,603.10	100%

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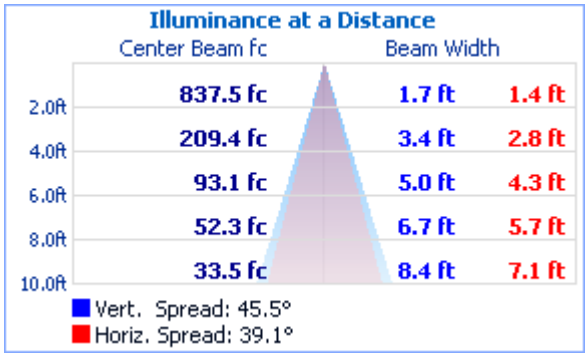
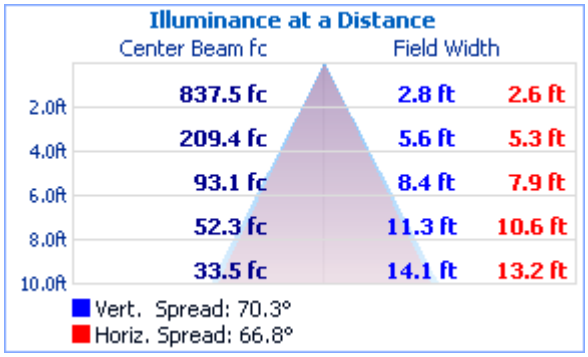
Test Results – Illuminance Plots

The following images depict the illuminance characteristics of the luminaire.



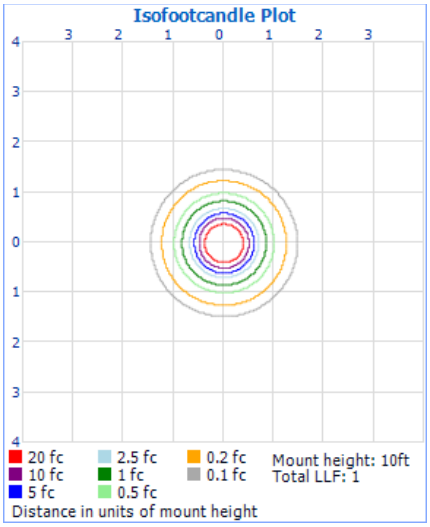


Beam Angle = 45.5° (V) / 39.1° (H)

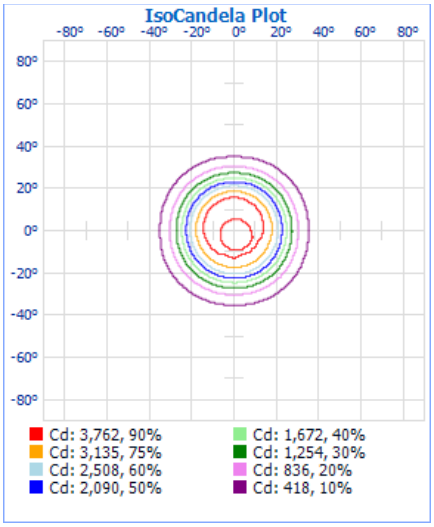
Field Angle = 70.3° (V) / 66.8° (H)

Test Results – Candela Plots

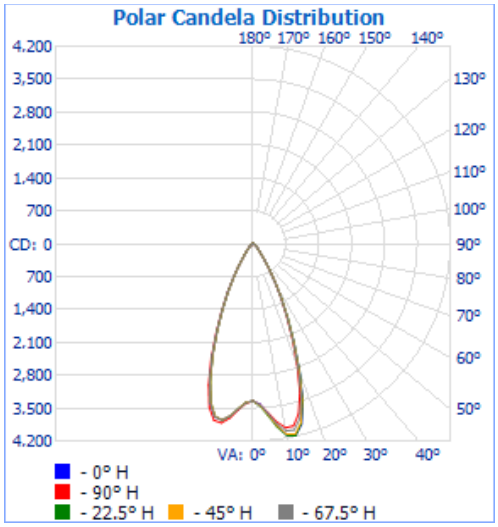
The following images depict the luminous intensity distribution characteristics of the luminaire:



Isofootcandle Plot



Isocandela Plot



Polar Candela

Maximum Candela = **4,186.7** at Horizontal: 22.50°, Vertical: 12.5°

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TÜV SÜD Photometric Testing Information

Testing is performed in accordance with the procedures outlined in IESNA LM79-2008. The sample is evaluated for photometric and electrical characteristics using an integrating sphere and a goniophotometer, located in an accredited, temperature and humidity-controlled, draft free photometric laboratory.

Sphere Geometry

The integrating spheres used for measurement utilize a "4π geometry" configuration in accordance with section 9 of IES LM-79-2008 and is applicable for all types of SSL products (directional and non-directional light projections). The spectroradiometer is an array-type detector manufactured and calibrated by Labsphere (Model# CDS1100).

Self-Absorption Correction

The integrating sphere uses self-absorption correction to eliminate errors due to mismatches between the standard reference lamp and the test samples being measured. This auxiliary correction lamp is a halogen type lamp powered by a calibrated Lamp Power Supply manufactured and calibrated by Labsphere (model LPS150). Ambient temperature is measured using a thermocouple located inside the integrating sphere at the same height as the sample under test (UUT) and not more than 1 meter in horizontal distance away from the sample (section 2.2 of LM79-2008). The thermocouple is located behind a baffle in order to eliminate any direct optical radiation from the sample under test.

Sample Stabilization

The sample (UUT) is placed inside the integrating sphere and powered by a regulated and conditioned alternating or direct current supply. The stabilization times shown on the results pages of this report denote the time of the 3rd measurement (of the 3 consecutive readings) since this is the minimum time that the sample is assumed to have taken to reach stabilization in accordance with section 5.0 of LM79-2008.

Sphere Calibration

The integrating sphere is calibrated using a quartzline halogen lamp with the following specifications:

Manufacturer: EYE Lighting International
Model# J94/JD28V75W
Voltage = 28.0 Volts DC
Wattage = 75.0 Watts
Calibration Current = 2.679 Amperes
Luminous Flux = 1685 Lumens
Calibration Date = 2-17-2011 (calibrated by Labsphere – NIST traceable).

Continued…..

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TÜV SÜD Photometric Testing Information (continued)

Goniophotometer

The Goniophotometer is a Type C optical measurement system in accordance with section 9.3.1 of IESNA LM79-2008.

Goniophotometer Calibration

The Goniophotometer is calibrated using a frosted tungsten filament FDS/DZE lamp with the following specifications:

Manufacturer: General Electric
Part Number: CSB-110
Lamp Number: 105-A
Voltage: 16.71 Volts DC
Wattage: 150.0 Watts
Calibration Current: 4.847 Amperes
Luminous Intensity: 166.3 Candelas
Calibration Date: 11-07-2011 (NIST traceable)

TÜV SÜD Test Equipment List:

TÜV SÜD Sphere System – contains the following:			
Description	**Manufacturer / Model#**	**TÜV SÜD Ref#**	**Calibration Due Date**
Integrating Sphere	Labsphere LM760	SPH003	weekly
Spectroradiometer	Labsphere CDS1100	ATLE0048	9/7/2015
Power Analyzer	Yokogawa WT210	ATLE0052	1/16/2016
Power Source	Chroma 61602	AC003	N/A
Thermometer	Fluke 52-II	ATLE0118	11/15/2015
TÜV SÜD Goniophotometer System – contains the following:			
Goniophotometer	M.E. GONC01	GON001	weekly
Spectroradiometer	Gigahertz Optik P9801	GIG001	weekly
Power Analyzer	Yokogawa WT210	ATLE0034	11/16/2015
Power Source	Chroma 61602	AC006	N/A