



# 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:** GTSOL5498-HI-GR  
**Description:** LED Module  
**Manufacturer:** Global Tech LED LLC

**Technical Report Number:** 72106215-02-LM79  
**Report Issue Date:** June 19<sup>th</sup>, 2015  
**Total Number of Pages:** 8 (including this page)

Report Prepared by:

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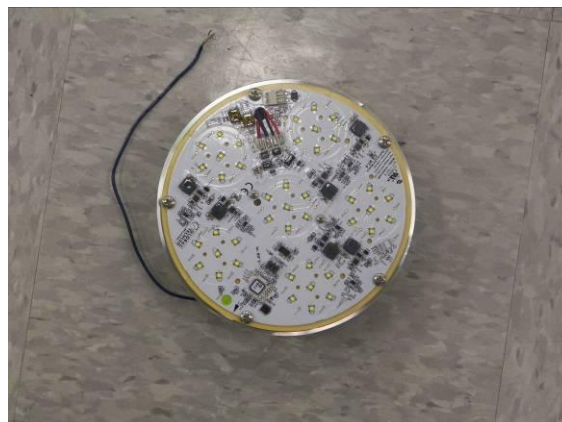
**Bryan Cubitt**  
TÜV SÜD Program Manager

**Summary of Key Test Results**

Model# **GTSOL5498-HI-GR**  
 Manufacturer **Global Tech LED LLC**  
 TÜV Sample# **1923-4**  
 Date of Test **June 19, 2015**

**Notes:**

Tested in FBU orientation (Fixture Base Up)  
 Test of a new LED Chip- Luxeon TX -using LED  
 module only. No optics.



<b>Parameter</b>	<b>Measured Result</b>
Luminous Flux	<b>10,520 Lumens</b>
Input Power	<b>98.79 Watts</b>
Efficacy	<b>106.49 Lumens/Watt</b>
C.C.T.	<b>5121 K</b>
C.R.I. (R <sub>a</sub> )	<b>73.4</b>
Beam Angle	<b>123.2° (V) / 122.7° (H)</b>
Stabilization Time	<b>34 minutes</b>
In-Situ Temp Test (ISTMT)**	<b>Not tested</b>

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	Global Tech LED LLC: GTSOL5498-HI-GR	
	Integrating Sphere	
Total Luminous Flux (Lumens)	10,520	
Luminous Efficacy (Lumens/Watt)	106.49	
Correlated Color Temperature (CCT)	5121	
Color Rendering Index (CRI – R <sub>a</sub> )	73.4	
R <sub>9</sub> Value	-20.6	
Total Radiant Flux (Watts)	32.3	
Chromaticity (Chroma x / Chroma y)	0.3418	0.3499
Chromaticity (Chroma u / Chroma v)	0.2098	0.3222
Chromaticity (Chroma u' / Chroma v')	0.2098	0.4834
D <sub>uv</sub> Value	0.00055	

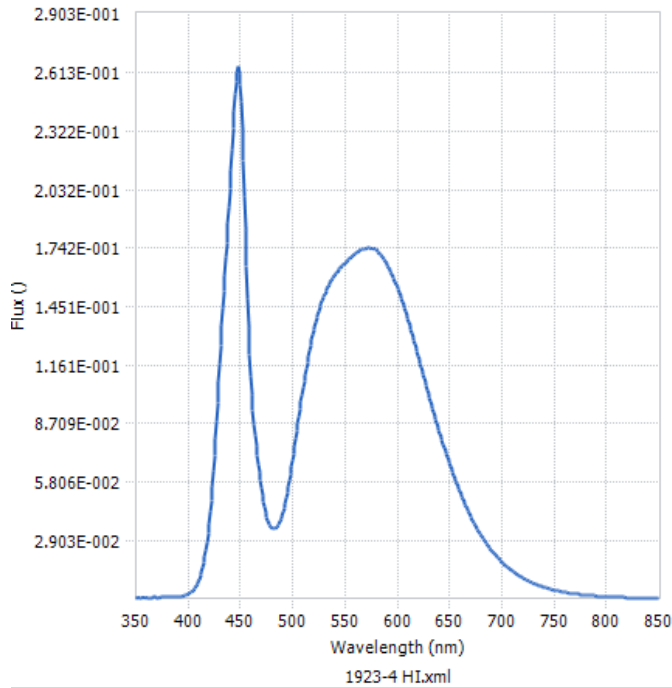
Electrical Results	Global Tech LED LLC: GTSOL5498-HI-GR	
	Integrating Sphere (120V / 277V)	
Input Power (Watts)	98.79	97.98
Input Voltage (Volts AC)	120.01	277.07
Input Current (Amps)	0.826	0.369
Power Factor	0.997	0.959
A-THD (Current %)	7.05	9.25
Input Frequency (Hertz)	60	60.0

Additional Parameters	Global Tech LED LLC: GTSOL5498-HI-GR	
	Integrating Sphere	Goniophotometer
Stabilization Time (Light and Power)	30 minutes	34 minutes
Test Geometry Configuration	4π	Type C
Ambient Temperature	24.1°C	24.8°C
ISTMT (In-Situ Temperature Measurement)	Not Tested	
Spacing Criteria	N/A	



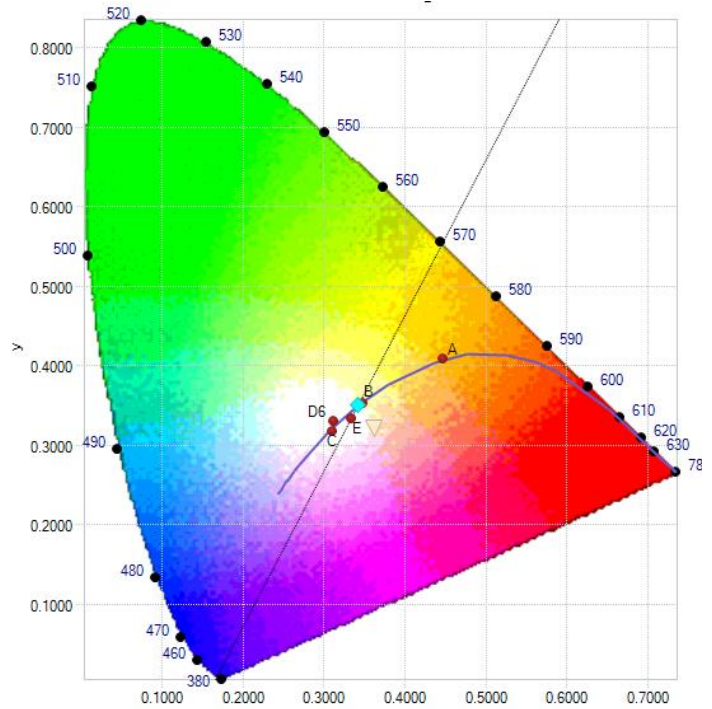
## Spectral Flux and Chromaticity Diagram

### Spectral Flux



**Spectral response of the Radiant Flux**  
**(350nm to 850nm)**

### Chromaticity Diagram



**Tristimulus values (from page 4):**

$$x / y = 0.3418 / 0.3499$$

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

## Zonal Lumen Summary

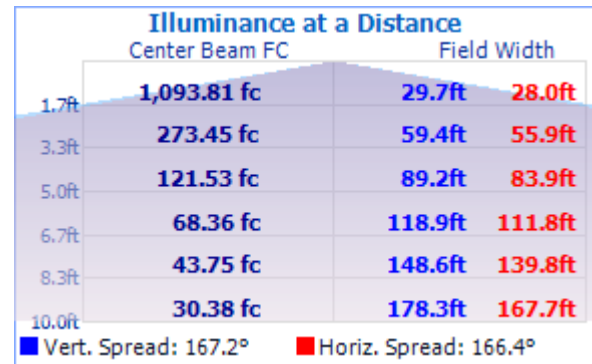
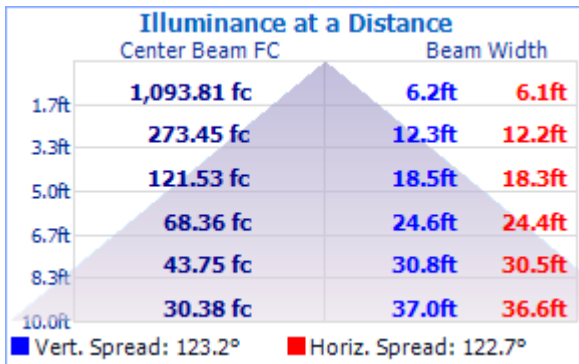
Zone	Lumens	% Lamp / Luminaire
0 - 60	7,488.2	75.5%
60 - 90	2,430.5	24.5%
0 - 90	9,918.7	100

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## Test Results – Illuminance Plots

The following images depict the illuminance characteristics of the luminaire.

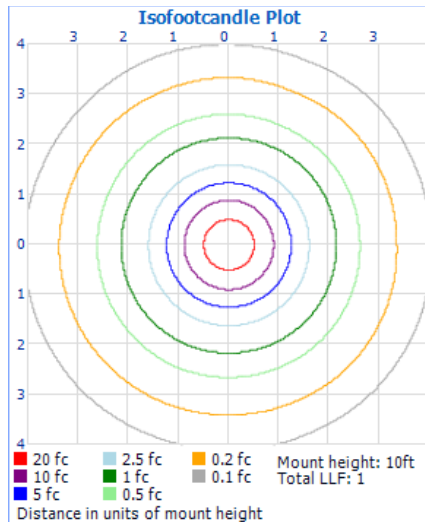


Beam Angle = 123.2° (V) / 122.7° (H)

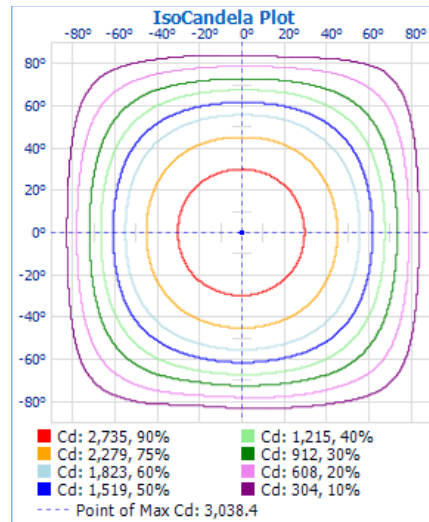
Field Angle = 167.2° (V) / 166.4° (H)

## Test Results – Candela Plots

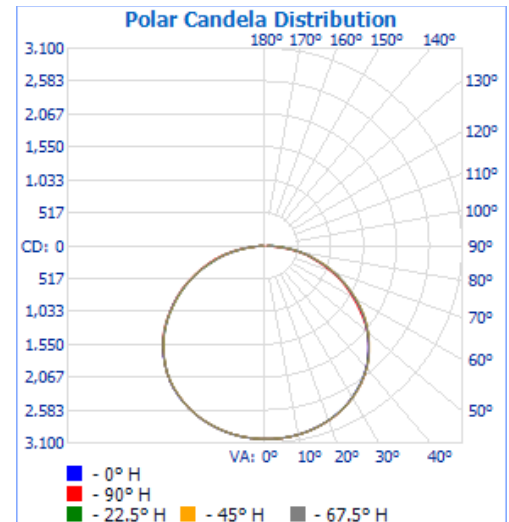
The following images depict the luminous intensity distribution characteristics of the luminaire:



Isofootcandle Plot



Isocandela Plot



Polar Candela

Maximum Candela = **3,038.4** at Horizontal: 0°, Vertical: 0°



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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 “ $4\pi$  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 3<sup>rd</sup> 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

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