IESNA LM79-2008 TEST REPORT

TÜV SÜD America, Inc.

Photometric Testing and Evaluation in Accordance with LM79-2008

Report Prepared for:

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Model Tested:	**MM630UNN50**
Model Description:	**LED HIGH OUTPUT MODULAR FLOOD - 630W, 120-277V, NARROW-NARROW DIST, 5000K, ARCH YOKE, GRAY**
Manufacturer:	**Maxlite**
Technical Report Number:	**72118974-02-LM79**
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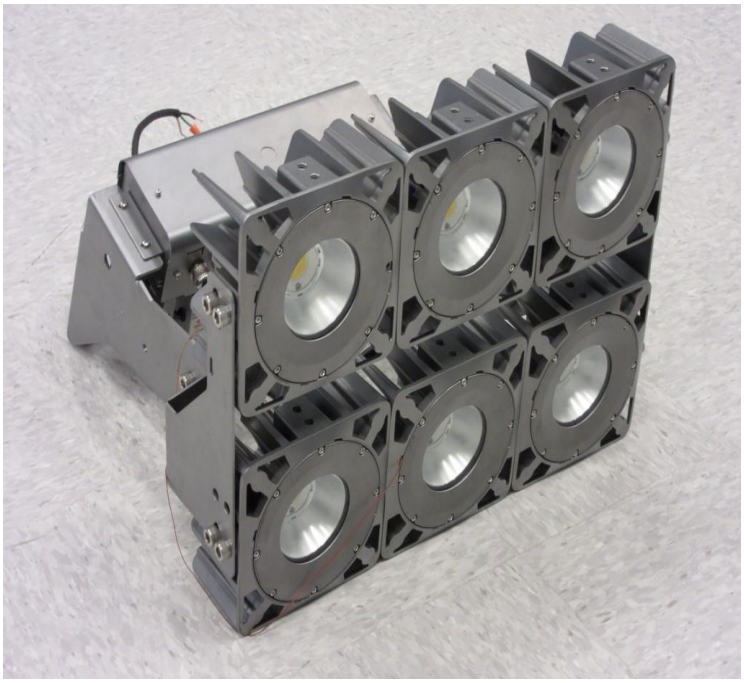
IESNA LM79-2008
TEST REPORT

August 4, 2016

Summary of Key Test Results

Model#	**MM630UNN50**
Manufacturer	**Maxlite**
TÜV Sample#	**2335-1**
Date of Test	**July 29, 2016**



Notes:

Tested in intended orientation: Aperture Down

LED Chipset: Citizen CLU046-1818C1-503M2G2

Driver Model: Meanwell HLG-320H-54A (x 2 units)

Parameter	Measured Result
Luminous Flux (Lumens)	**61,800**
Input Power (Watts)	**624.88**
Efficacy (Lumens/Watt)	**98.90**
Color Temperature (CCT K)	**5413**
Color Rendering Index (CRI)	**83.5**
Beam Angle	**29.5° (V) / 28.2° (H)**
Stabilization Time (Min)	**90**
In-Situ Temp Test**	**94.8 °C / 65.4 °C (LED/Driver)**

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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Testing Certificates
Electrical 2955.09

TÜV SÜD America is accredited under the ISO/IEC 17025:2005 program

IESNA LM79-2008
TEST REPORT

August 4, 2016

TABLE OF CONTENTS

IESNA LM79-2008
TEST REPORT

August 4, 2016

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%.

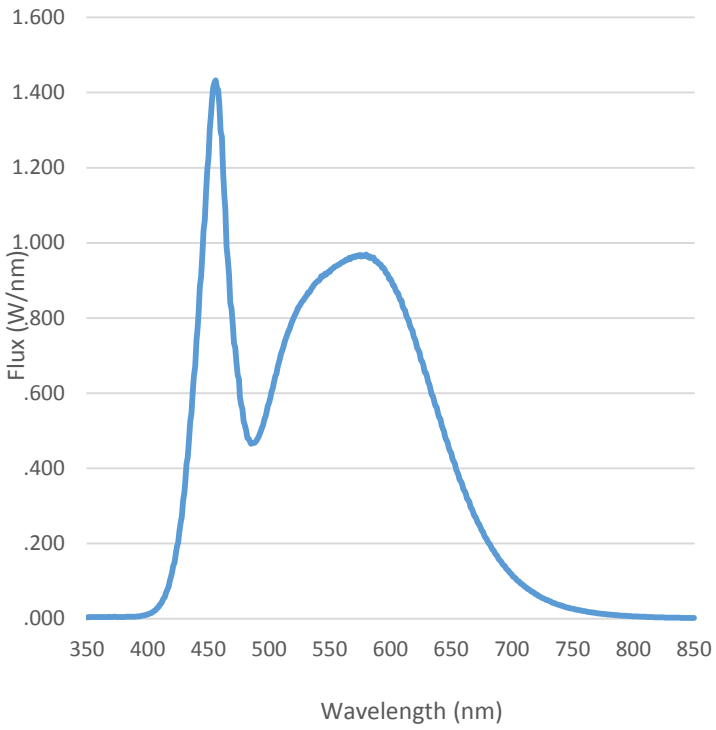
Photometric Results (120V Only)	MM630UNN50	
	Integrating Sphere	
Total Luminous Flux (Lumens)	61,800	
Luminous Efficacy (Lumens/Watt)	98.90	
Correlated Color Temperature (CCT K)	5413	
Color Rendering Index (CRI-Ra)	83.5	
R9 Value	10.0	
Total Radiant Flux (Watts)	197.0	
Chromaticity (Chroma x / Chroma y)	0.3345	0.3476
Chromaticity (Chroma u / Chroma v)	0.2058	0.3208
Chromaticity (Chroma u' / Chroma v')	0.2058	0.4811
Duv Value	0.00240	

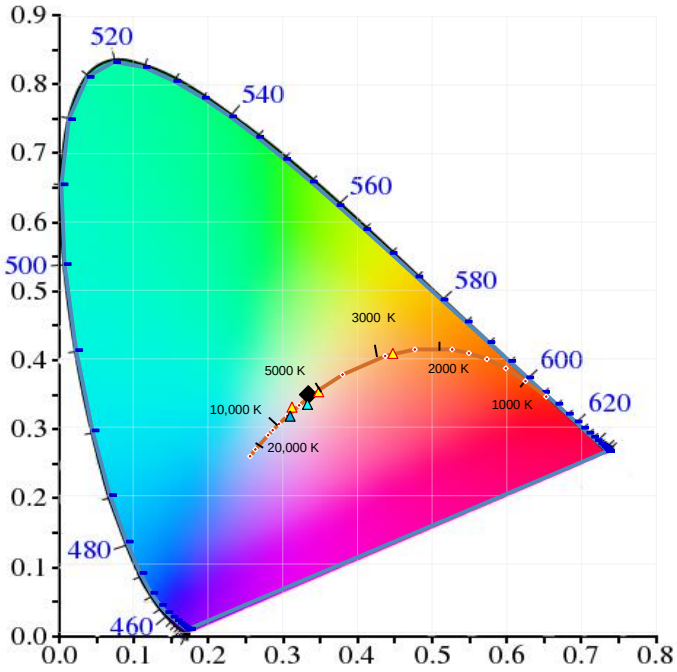
Electrical Results	MM630UNN50	
	Integrating Sphere (120V / 277V)	
Input Power (Watts)	624.88	604.00
Input Voltage (Volts AC)	119.97	277.11
Input Current (Amps)	5.218	2.268
Power Factor	0.998	0.961
A-THD% (Current %)	2.53	5.98
Input Frequency (Hz)	60.0	60.0
LED Drive Current (Milliamps)*	N/A	

*** Manufacturer Reported Data**

Additional Parameters	MM630UNN50	
	Integrating Sphere	Goniophotometer
Stabilization Time (Light and Power)	90 Minutes	77 minutes
Test Geometry Configuration	4π	Type C
Spectroradiometer	Labsphere CDS1100	Gigahertz Optik P9801
Ambient Temperature	24.1 °C	25.0 deg C
In-Situ Temp Test (LED TMP / Driver TMP)	LED TMP 94.8 °C	DRIVER TMP 65.4 °C
Spacing Criteria	N/A	

Spectral Flux and Chromaticity Diagram





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

λ(Peak): **455.7 nm** **λ(Dom):** **557.9 nm**

Chromaticity Diagram, CIE 1931, 2 Degree

Tristimulus Values: x/y = 0.3345 / 0.3476

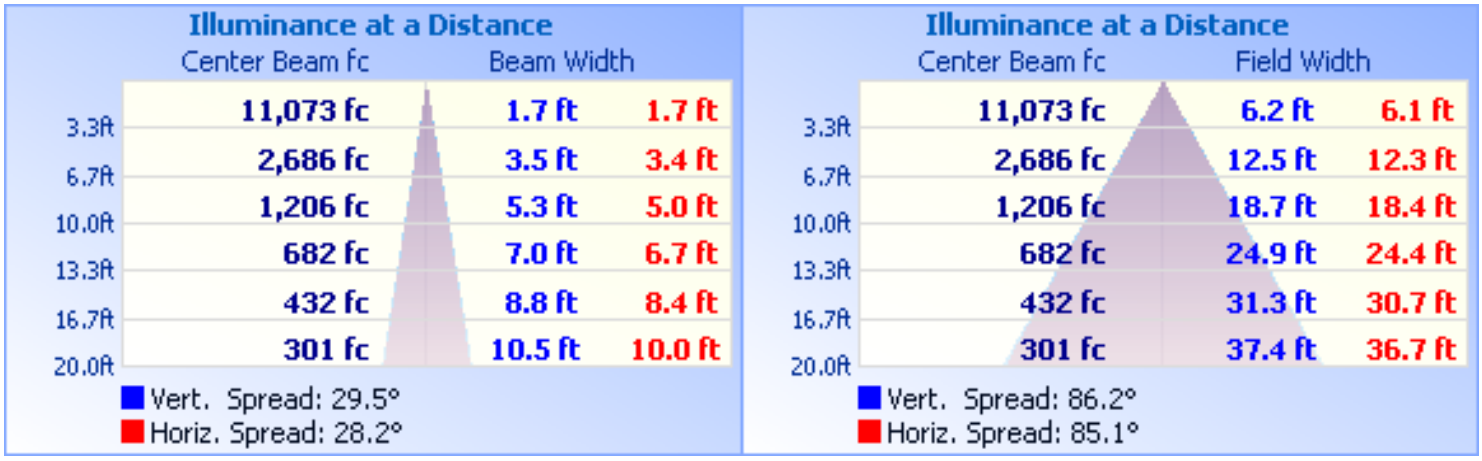
The locations on the diagram of the tristimulus coordinates are indicated by the black diamond.

Zonal Lumen Summary

Zone	Lumens	% Lamp \ Luminaire
0-60	60,083.3	99.4%
60-90	375.4	0.6%
0-90	60,458.7	100.0%
90-180	0.0	0.0%
0-180	60,458.7	100.0%

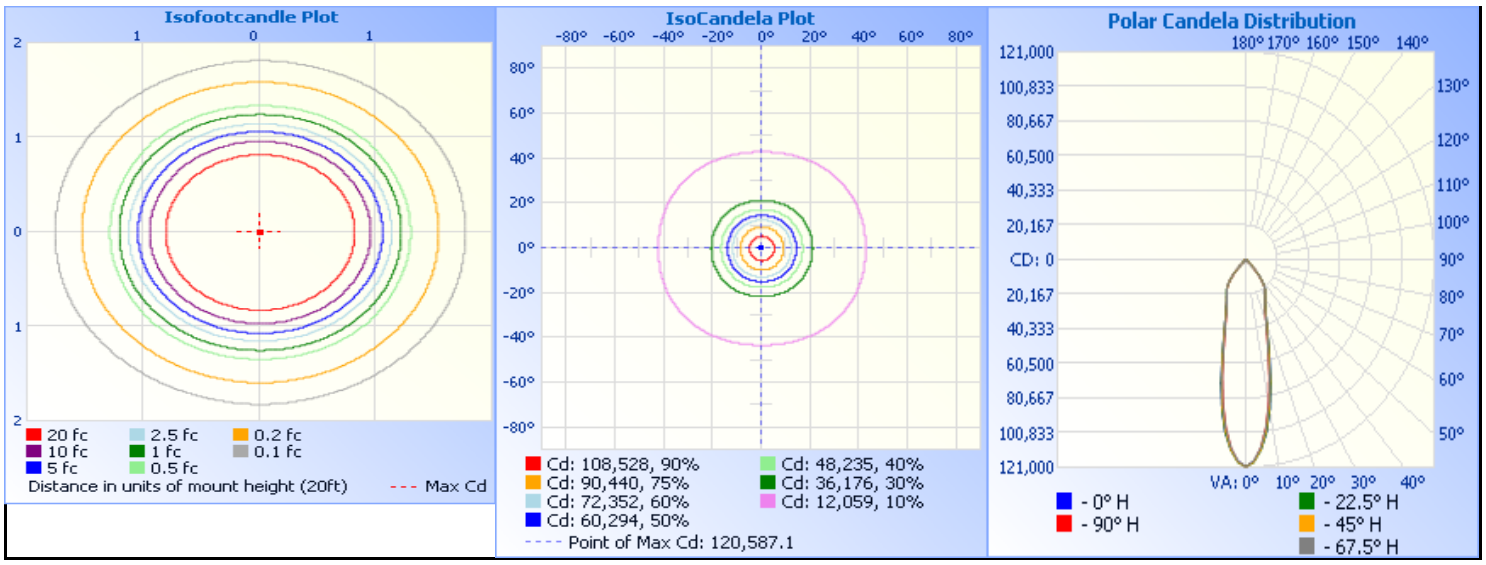
Test Results - Illuminance Plots

The following images depict the illuminance characteristics of the luminaire:



Test Results - Candela Plots

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

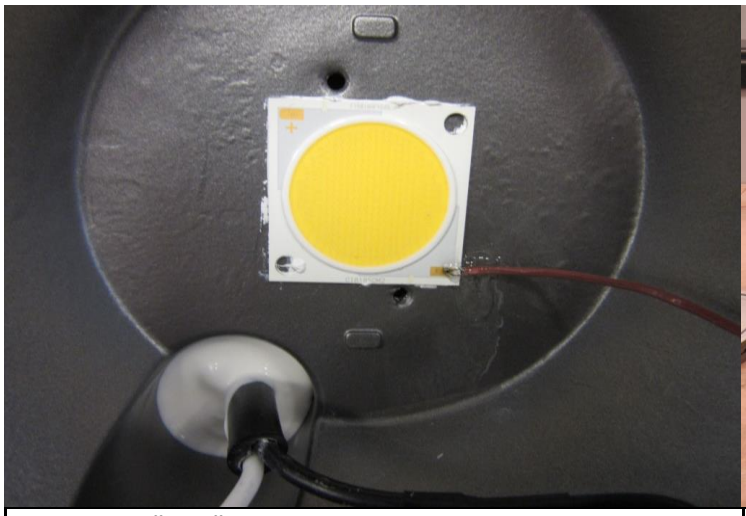


ISOfootcandle Plot ISOCandela Plot Polar Candela

Maximum Candela = **120,587.1** at Horizontal: 0.0°, Vertical: 0.0°

ISTMT Temperature Measurement

ISTMT temperature measurement at thermal stabilization (8 hours continuous operation).
Thermocouple locations (shown below) are in accordance with manufacturers recommended / stated guidelines for TMP - Temperature Measurement Point.



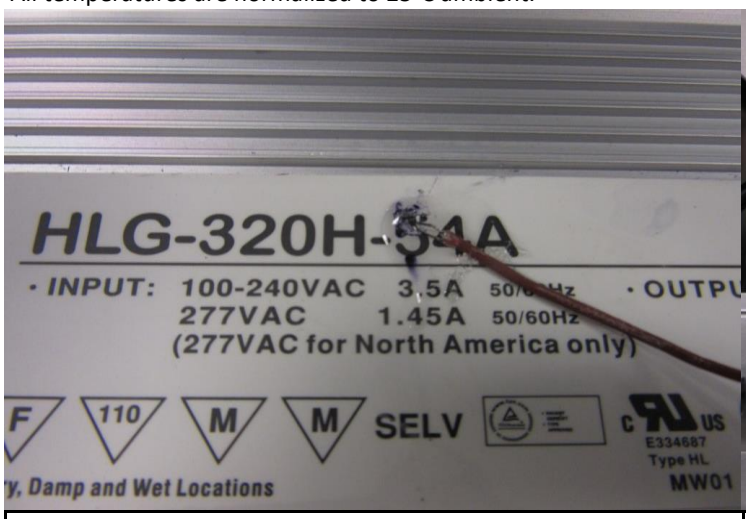
"LED" Thermocouple Location at Tc

Sample Overview (LED_{TMP} Location)

LED Test Results for Maxlite : MM630UNN50

LED_{TMP} Temperature	94.8°C

All temperatures are normalized to 25°C ambient.



"Driver" Thermocouple Location at Tc

Sample Overview ($DRIVER_{TMP}$ Location)

Driver Test Results for Maxlite : MM630UNN50

DVR_{TMP} Temperature	65.4°C

All temperatures are normalized to 25°C ambient.

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 Volts DC
Wattage = 75 Watts
Calibration Current = 2.679 Amperes
Luminous Flux = 1685 Lumens
Calibration Date = 2/17/2011 Labsphere - NIST traceable

Continued……..

TÜV SÜD Photometric Testing Information (continued)

Goniophotometer

The Goniophotometer is a Mirror based 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: 112-A
Voltage = 16.52 Volts DC
Wattage = 150 Watts
Calibration Current = 4.816 Amperes
Luminous Intensity = 151.5 Candelas
Calibration Date = 2/13/2011 (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	09/07/16
Power Analyzer	Yokogawa WT210	ATLE0058	03/09/17
Power Source	Chroma 61602	AC003	N/A
TÜV SÜD Mirror Goniophotometer System – contains the following			
Description	Manufacturer / Model#	TÜV SÜD Ref#	Calibration Due Date
Goniophotometer	M.E. GONC02	GON002	weekly
Spectroradiometer	Gigahertz Optik P9801	GIG002	weekly
Power Analyzer	Yokogawa WT210	ATLE0031	11/26/16
Power Source	Chroma 61602	AC007	N/A
TÜV SÜD ISTMT Testing– contains the following			
Description	Manufacturer / Model#	TÜV SÜD Ref#	Calibration Due Date
Thermometer	Fluke 52-II	ATLE0119	3/9/2017