



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:	LSU4806SU30DV40
Sample Description:	Stairwell and Passageway Luminaires, Linear Ambient Luminaires: Direct
Manufacturer:	Maxlite, Inc.
Technical Report Number:	J11404354-01-LM79
Report Issue Date:	April 28th, 2014
Total Number of Pages:	11 (including this page)

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TÜV SÜD Program Manager



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Summary of Key Test Results

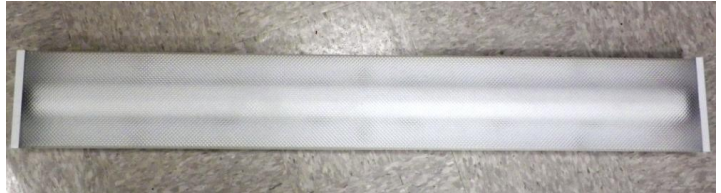
Model# **LSU4806SU30DV40**

Manufacturer **Maxlite, Inc.**

TÜV Sample# 1313-4

Date of Test April 24th 2014

Notes: Tested in intended orientation
(Horizontal, FBU – Fixture Base Up)



Parameter	Measured Result
Luminous Flux	3,583 Lumens
Input Power	30.86 Watts
Efficacy	116.09 Lumens/Watt
C.C.T.	4162 K
C.R.I. (R _a)	82.7
Beam Angle	78.0° (H) / 90.6° (V)
Stabilization Time	45 minutes
In-Situ Temp Test (ISTMT)**	42.8°C (LED)

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	Maxlite- LSU4806SU30DV40	
	Integrating Sphere	
Total Luminous Flux (Lumens)	3,583	
Luminous Efficacy (Lumens/Watt)	116.09	
Total Radiant Flux (Watts)	11.1	
Correlated Color Temperature (CCT)	4162	
Color Rendering Index (CRI – R _a)	82.7	
R ₉ Value	12.2	
Chromaticity (Chroma x / Chroma y)	0.3744 / 0.3764	
Chromaticity (Chroma u / Chroma v)	0.2213 / 0.3337	
Chromaticity (Chroma u' / Chroma v')	0.2213 / 0.5005	
D _{uv} Value	0.00163	

Electrical Results (120V unless stated otherwise)	Maxlite- LSU4806SU30DV40	
	Integrating Sphere	
Input Power (Watts)	30.86	
Input Voltage (Volts AC)	120.01	
Input Current (Amps)	0.258	
Power Factor @120VAC	0.997	
Power Factor @277VAC	0.903	
Input Frequency (Hertz)	60.0	
A-THD @120VAC (Current %)	1.30%	
A-THD @277VAC (Current %)	6.29%	

Additional Parameters	Maxlite- LSU4806SU30DV40	
	Integrating Sphere	Goniophotometer
Stabilization Time (Light and Power)	45 minutes	46 minutes
Test Geometry Configuration	4π	Type C
Ambient Temperature	24.1°C	24.4°C
ISTMT (In-Situ Temperature Measurement)	42.8°C (LED)	
Spacing Criteria	0.98 (0° – 180°) / 1.22 (90° – 270°)	



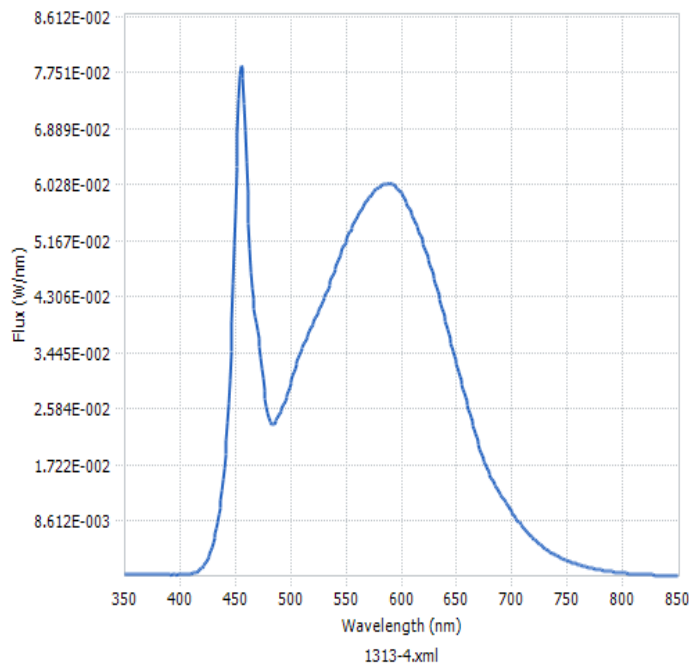
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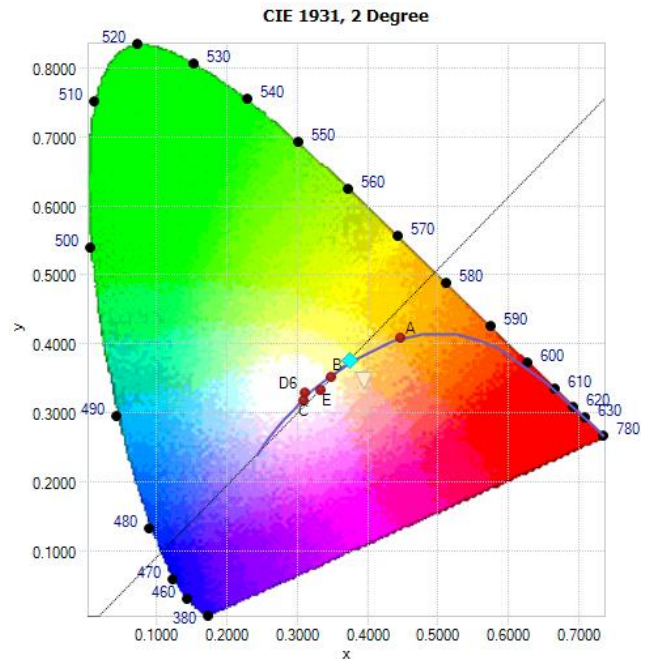
Spectral Flux and Chromaticity Diagram

Spectral Flux



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

Chromaticity Diagram



Tristimulus values (from page 4):

$x / y = 0.3744 / 0.3764$

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

Zonal Lumen Summary

Zone	Lumens	% Lamp / Luminaire
0 - 60	2,533.3	73.1 %
60 - 90	695.9	20.1 %
0 - 90	3,229.2	93.1 %
90 - 180	238.1	6.9 %
0 - 180	3,467.3	100 %

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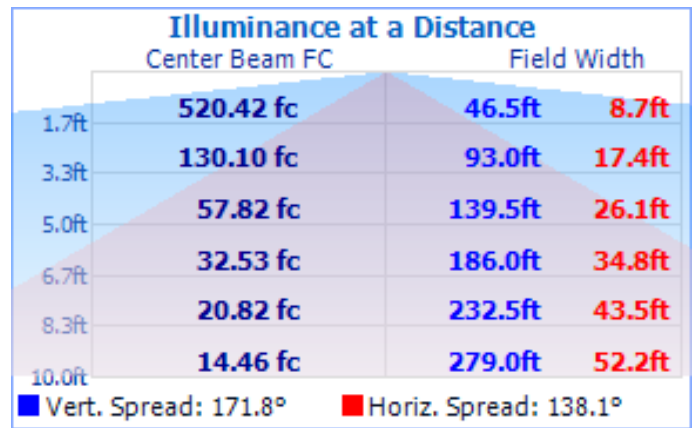
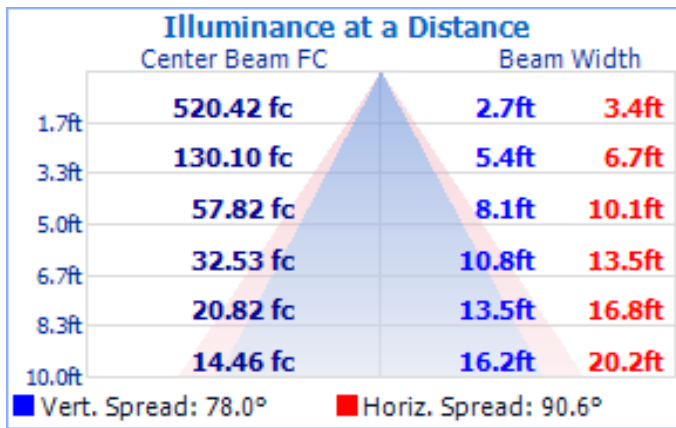


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Test Results – Illuminance Plots

The following images depict the illuminance characteristics of the luminaire.

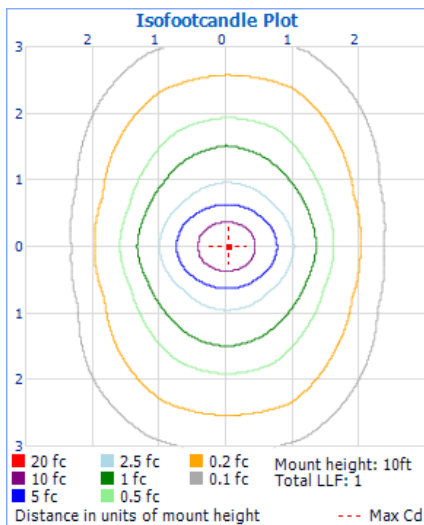


Beam Angle = 78.0° (V) / 90.6° (H)

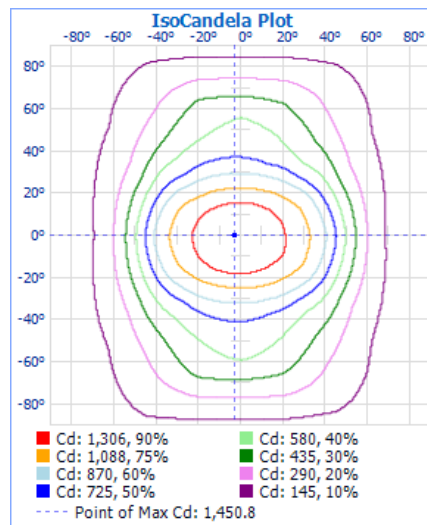
Field Angle = 171.8° (V) / 138.1° (H)

Test Results – Candela Plots

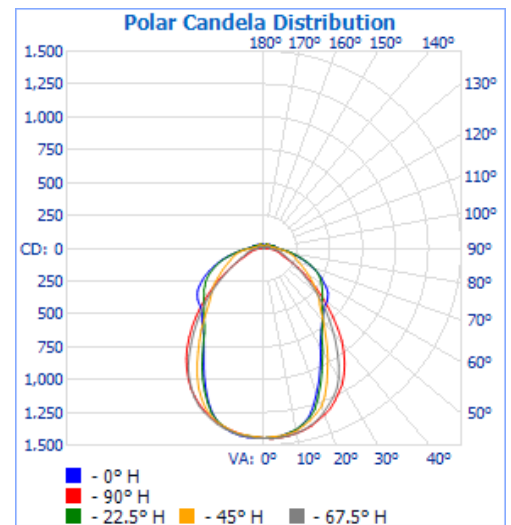
The following images depict the luminous intensity distribution characteristics of the luminaire:



Isofootcandle Plot



Isocandela Plot

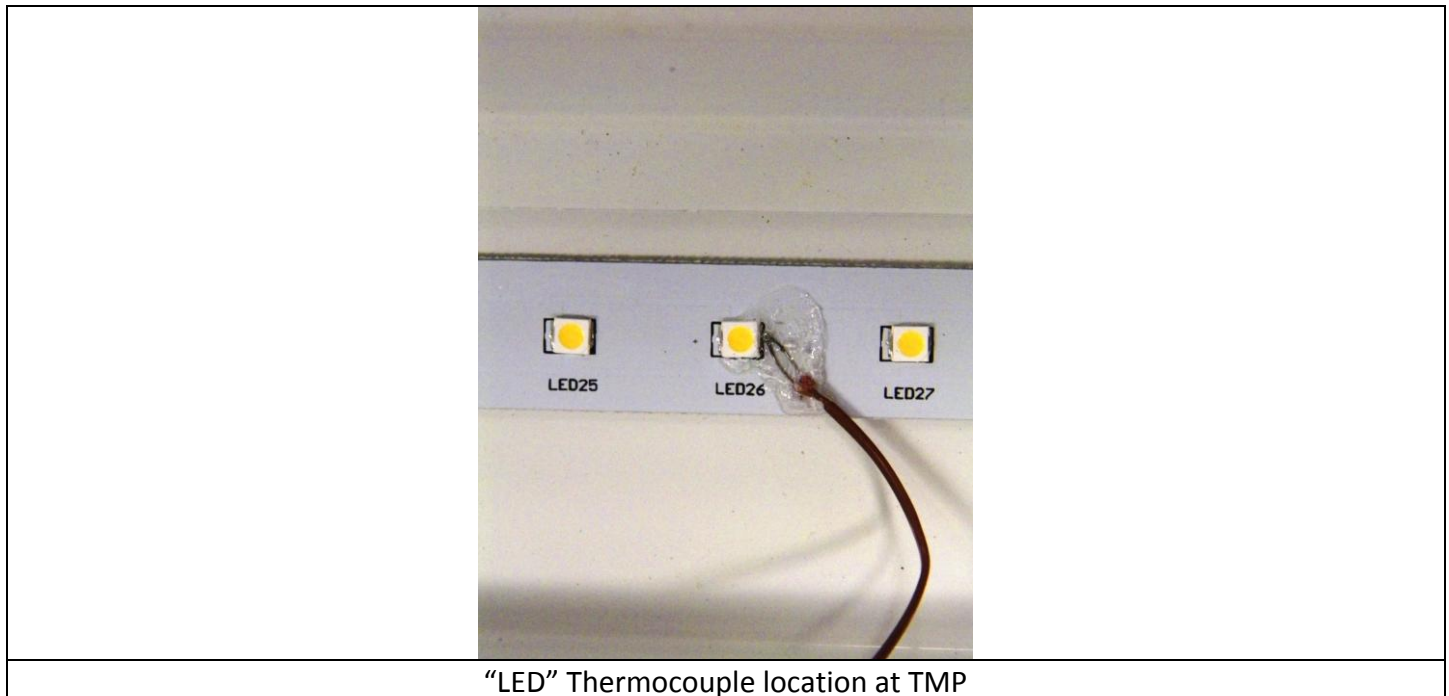


Polar Candela

Maximum Candela = 1,450.8 at Horizontal: 90.0°, Vertical: 2.5°

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.



Test Results for Maxlite- LSU4806SU30DV40

LED TMP Temperature	42.8°C
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All temperatures are normalized to 25°C ambient.

Test Equipment

Description	Manufacturer / Model#	TÜV SÜD Ref#	Calibration Due Date
Thermometer	Fluke 52-II	ATLE0118	1/16/2015



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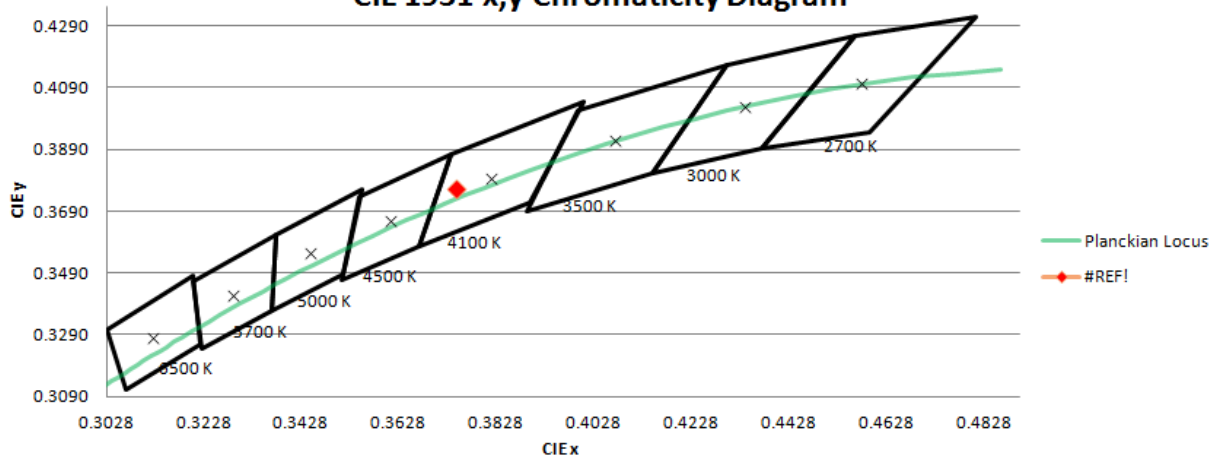
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Addendum A (DLC Program Results) –

Category 9: DesignLights Consortium Product Qualification Criteria, Technical Requirements Table, v2.1

09	Stairwell and Passageway Luminaires	Nominal Requirements	Tolerance	Actual Requirement	Measured Results
	Minimum Light Output	750 lm	-10%	675 lm	3,583 lm
	Zonal Lumen Requirements	≥85%: 0-90°	-3%	≥82%	93.1%
	Minimum Luminaire Efficacy	75 lm/W	-3%	72.75 lm/W	116.09 lm/W
	Allowable CCTs (ANSI C78.377-2008)	≤5700K	Defined by ANSI C78.377	≤5700K	4162
	Minimum CRI	65	-2 points	63	82.7
	L70 Lumen Maintenance	50,000 hrs	None	50,000 hrs	
	Minimum Luminaire Warranty	5 years	None	5 Years	
	Power Factor 120 / 277VAC	≥ 0.9	-3%	0.873	0.997 / 0.903
	Total Harmonic Distortion (THD-A%)	≤20%	+5%	25%	1.30 / 6.29

CIE 1931 x,y Chromaticity Diagram



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Continued.....Addendum A (DLC Program Results) –

Category 21: DesignLights Consortium Product Qualification Criteria, Technical Requirements Table, v2.1

21	Linear Ambient Luminaires: Direct	Nominal Requirements	Tolerance	Actual Requirement	Measured Results
	Minimum Light Output	375 lm/ft	-10%	337.5 lm/ft	3,583 lm
	Zonal Lumen Requirements	≥40% 0-60°	-10%	≥30%	73.1%
	Minimum Luminaire Efficacy	85 lm/W	-3%	82.45 lm/W	116.09 lm/W
	Allowable CCTs (ANSI C78.377-2008)	≤5000K	Defined by ANSI C78.377	≤5000K	4162
	Minimum CRI	80	-2 points	78	82.7
	L70 Lumen Maintenance	50,000 hrs	None	50,000 hrs	
	Minimum Luminaire Warranty	5 years	None	5 Years	
	Power Factor 120 / 277VAC	≥ 0.9	-3%	0.873	0.997 / 0.903
	Total Harmonic Distortion (THD-A%)	≤20%	+5%	25%	1.30 / 6.29



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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 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: 150.0 Watts
- Calibration Current: 4.816 Amperes
- Luminous Intensity: 151.5 Candelas
- Calibration Date: 02-13-2011 (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	9/7/2014
Power Analyzer	Yokogawa WT210	ATLE0032	11/21/2014
Power Source	Chroma 61602	AC003	N/A
Thermometer	Fluke 52-II	ATLE0118	1/16/2015
TÜV SÜD Mirror Goniophotometer System – contains the following:			
Goniophotometer	M.E. GONC02	GON002	Weekly
Spectroradiometer	Gigahertz Optik P9801	GIG002	Weekly
Power Analyzer	Yokogawa WT210	ATLE0031	11/21/2014
Power Source	Chroma 61603	AC007	N/A

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