



IESNA LM79-2008 Test Report

TÜV SÜD America

Photometric Testing and Evaluation in Accordance with LM79-2008

Report Prepared for:

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Owner

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Sample Tested: Betty in Acrylic
Sample Description: LED Luminaire
Manufacturer: Alva Light Inc.

Technical Report Number: Ji1409766-01-LM79
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Summary of Key Test Results

Model# **Betty in Acrylic**
 Manufacturer **Alva Light Inc.**
 TÜV Sample# 1511-1
 Date of Test October 8th 2014
 Notes: Tested in intended orientation
 (Horizontal)



Parameter	Measured Result
Luminous Flux	924.1 Lumens
Input Power	9.55 Watts
Efficacy	96.72 Lumens/Watt
C.C.T.	2743 K
C.R.I. (R _a)	81.3
Beam Angle	126.3° (V) / 138.8° (H)
Stabilization Time	45 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	Alva Light Inc. - Betty in Acrylic	
	Integrating Sphere	
Total Luminous Flux (Lumens)	924.1	
Luminous Efficacy (Lumens/Watt)	96.72	
Total Radiant Flux (Watts)	2.88	
Correlated Color Temperature (CCT)	2743	
Color Rendering Index (CRI – R _a)	81.3	
R ₉ Value	5.9	
Chromaticity (Chroma x / Chroma y)	0.4544 / 0.4064	
Chromaticity (Chroma u / Chroma v)	0.2609 / 0.3500	
Chromaticity (Chroma u' / Chroma v')	0.2609 / 0.5249	
D _{uv} Value	-0.00111	

Electrical Results	Alva Light Inc. - Betty in Acrylic	
	Integrating Sphere (120V)	
Input Power (Watts)	9.55	
Input Voltage (Volts AC)	120.05	
Input Current (Amps)	0.0797	
Power Factor	0.999	
Input Frequency (Hertz)	60.0	
A-THD (Current %)	5.49%	

Additional Parameters	Alva Light Inc. - Betty in Acrylic	
	Integrating Sphere	Goniophotometer
Stabilization Time (Light and Power)	45 minutes	43 minutes
Test Geometry Configuration	4π	Type C
Ambient Temperature	24.8°C	24.7°C
ISTMT (In-Situ Temperature Measurement)	Not tested	
Spacing Criteria	1.30 (0° – 180°) / 1.30 (90° – 270°)	



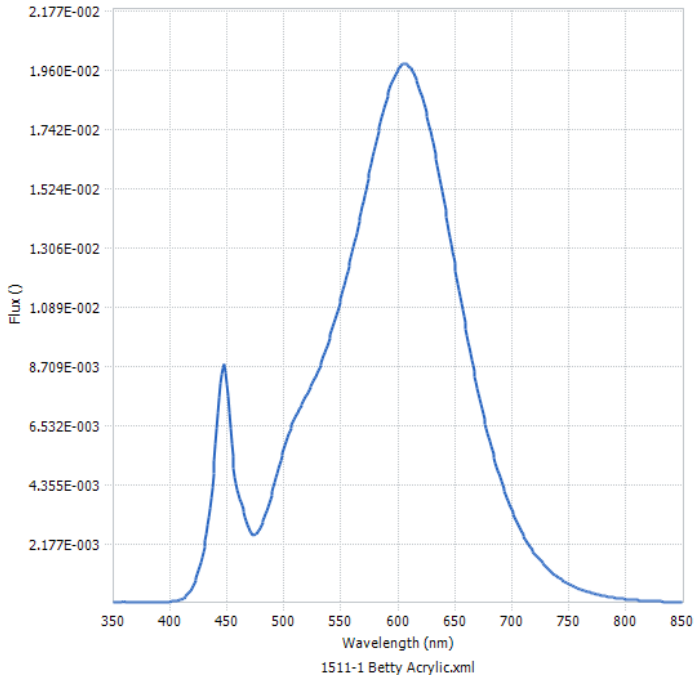
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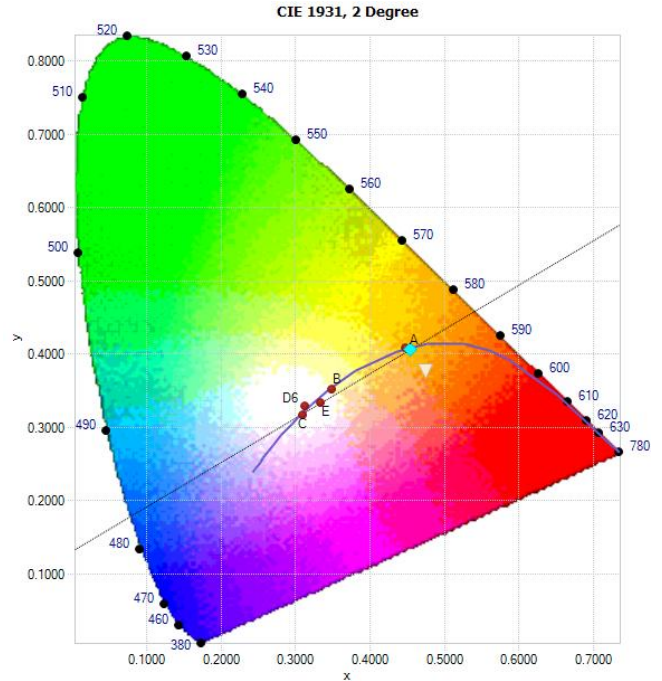
Spectral Flux and Chromaticity Diagram

Spectral Flux



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

Chromaticity Diagram



Tristimulus values (from page 4):

$$x / y = 0.4544 / 0.4064$$

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

Zonal Lumen Summary

Zone	Lumens	% Lamp / Luminaire
0 - 60	511.7	56.5 %
60 - 90	231.4	25.6 %
0 - 90	743.2	82.1 %
90 - 180	162.2	17.9 %
0 - 180	905.4	100 %

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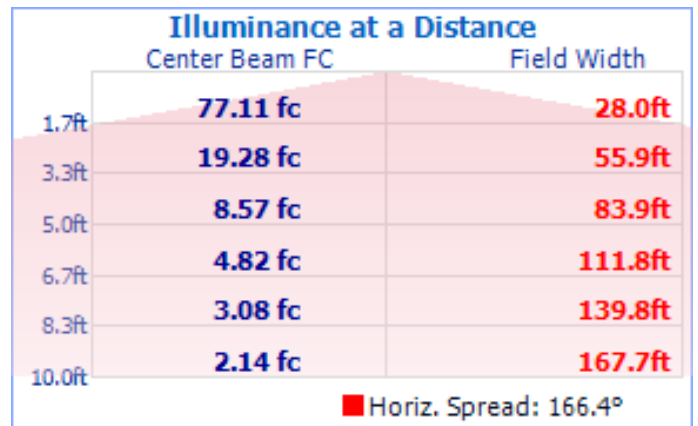
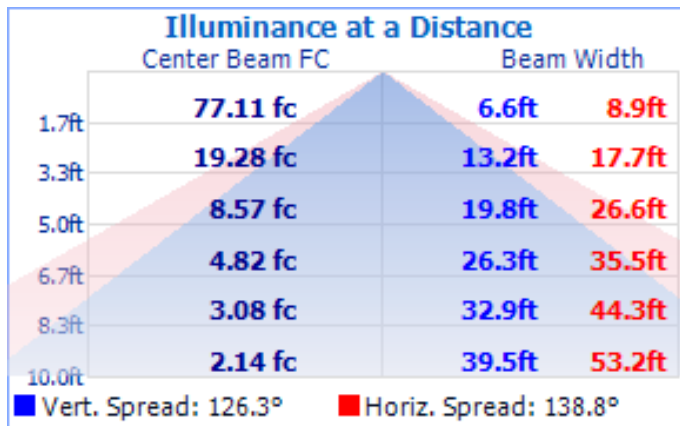


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Test Results – Illuminance Plots

The following images depict the illuminance characteristics of the luminaire.

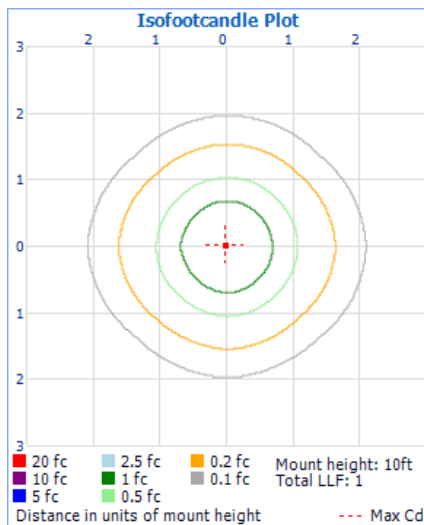


Beam Angle = 126.3° (V) / 138.8° (H)

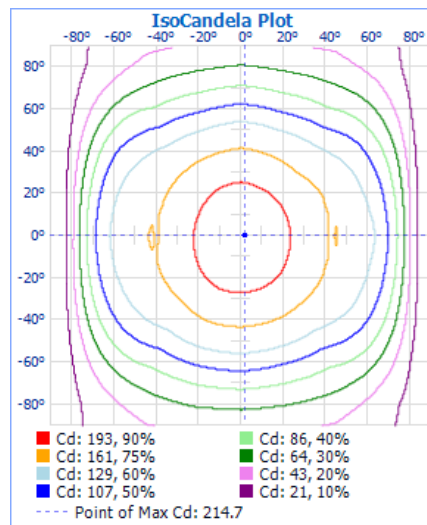
Field Spread = 166.4° (H)

Test Results – Candela Plots

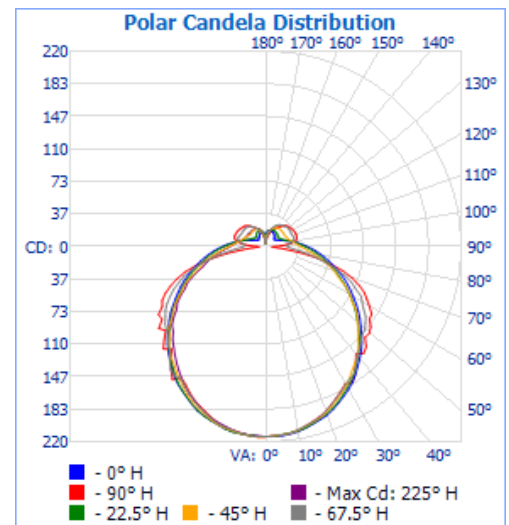
The following images depict the luminous intensity distribution characteristics of the luminaire:



Isofootcandle Plot



Isocandela Plot



Polar Candela

Maximum Candela = 214.7 at Horizontal: 225.0°, Vertical: 2.5°



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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 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	9/7/2016
Power Analyzer	Yokogawa WT210	ATLE0032	11/21/2014
Power Source	Chroma 61602	AC003	N/A
Thermometer	Fluke 52-II	ATLE0008	11/17/2014
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	11/16/2014
Power Source	Chroma 61603	AC007	N/A

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