

ORB OPTRONIX - SOLID STATE LIGHTING MEASUREMENT LABORATORY- PRODUCT REPORT
 Type C-Horizontal Goniometer Report



Orb Optronix, Inc.
 1003 7th Ave
 Kirkland, WA 98033
 tel: 425 605 8500
 fax: 801 912 2645

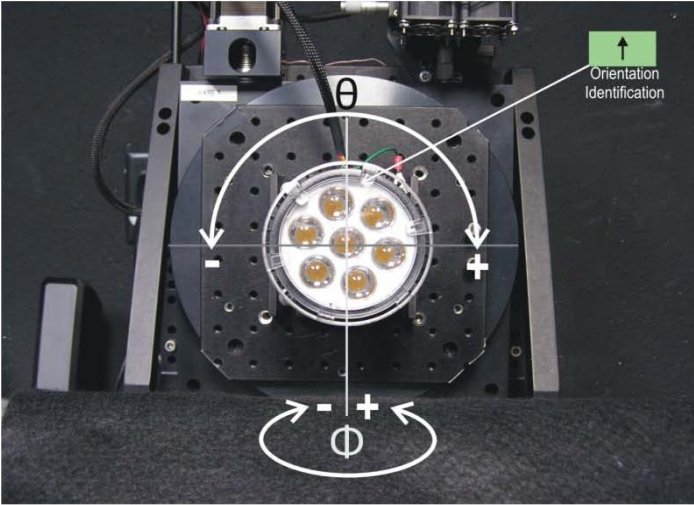
Prepared By: AM
 INITIALS ONLY
 Device Ref #: 3020
 Date Issued: 01/11/2010
 Date Tested: 01/11/10 10:47:30.476

CUSTOMER INFORMATION:

Prepared for: Orb Optronix, Inc.
 1003 7th Ave
 Kirkland, WA 98033

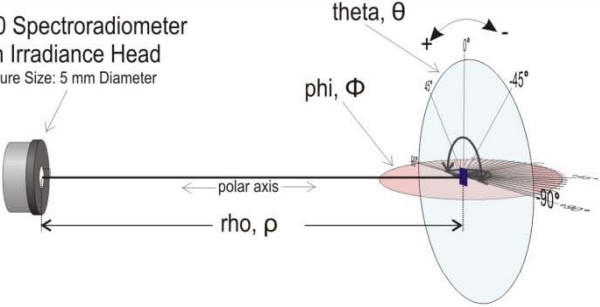
Job Number: ORB3020
Test Report: MG3020
Contact: Rob Leonard
E-mail: Sales@OrbOptronix.com
Phone: (425)-605-8500

Evaluation For: 3020



Orientation Identification

SP-100 Spectroradiometer
 With Irradiance Head
 Aperture Size: 5 mm Diameter



The image to the left was taken from the position of the spectroradiometer with the inclination angle (phi) at 0° coaxial to the polar axis, and the angle of rotation, (theta) at 0°, as depicted in the graphic above. A total of 364 measurements were taken at a distance (rho) of 50 cm. This was accomplished by varying the inclination angle in the horizontal plane between -90° and 90° in 2° increments (91 measurements), and in the vertical plane between 0° and 135° in 45° increments (91 x 4 = 364 measurements). Fixture tested normal to standard operating configuration.

Luminaire on Goniometer as Tested, Orientation is 0° Phi, 0° Theta.

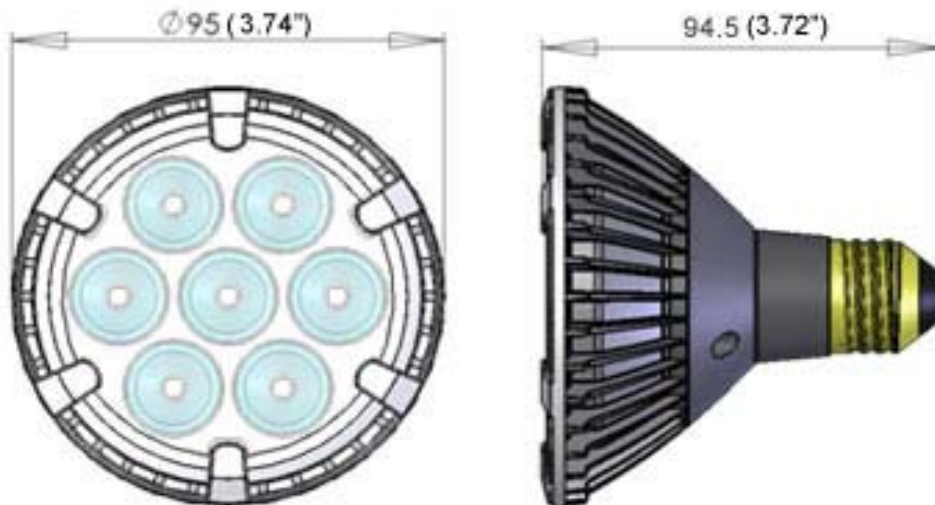


Figure 2: Luminaire Dimensional Reference as Tested

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WEIGHTED AVERAGES FOR GONIOMETER MEASUREMENT RESULTS					MANUFACTURER SPECIFICATIONS				
Total Integrated Radiant Flux	0.611	Φ	W	Chromaticity Coordinates			Voltage	Not Specified	
Total Integrated Luminous Flux	208.71	F	lm	x	0.4709		Current	Not Specified	
Peak Candella	880.25	F	cd	y	0.4209		Power	Not Specified	W
Luminous Efficacy	24.64		lm/W	u	0.2651		Frequency	Not Specified	Hz
Dominant Wavelength	604.50		nm	v	0.3558		Dimmable	Not Specified	
Color Purity	46.41		%	u'	0.2651		Orientation	Not Specified	
CCT	2522		K	v'	0.5338		Temperature	Not Specified	°C
CRI	67.1			DeltaUV	-0.0003		Environment	Dry Locations	
							Manufactured	Not Specified	

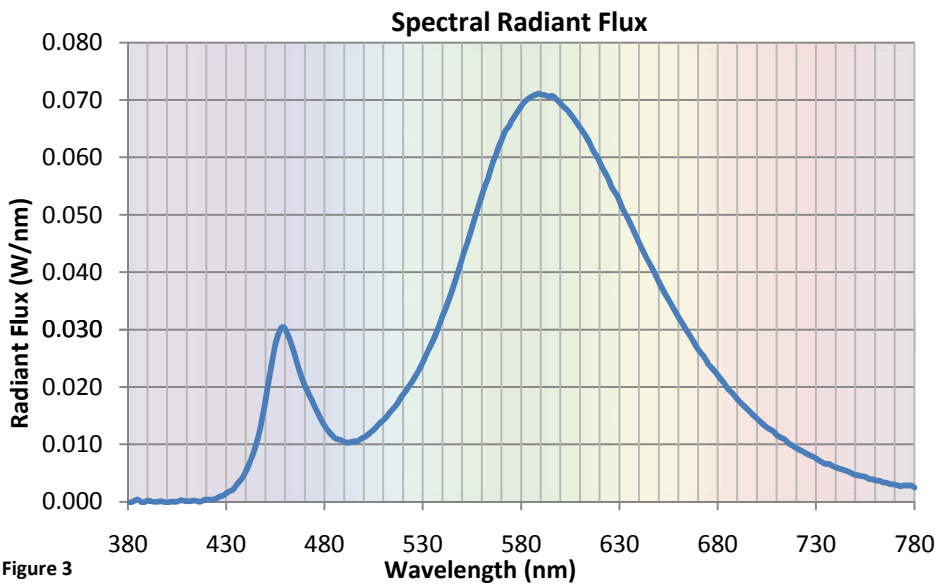


Figure 3

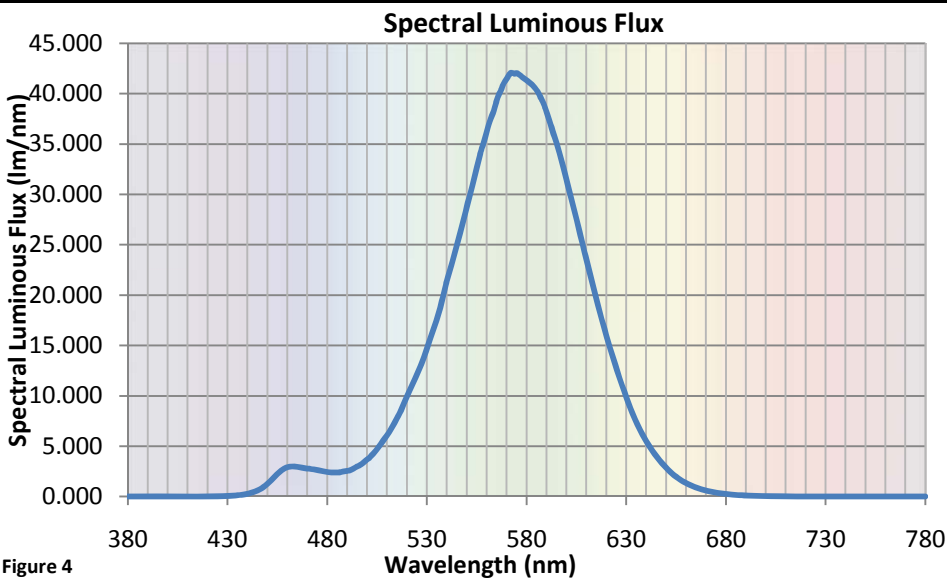


Figure 4

AVERAGE DUT MEASUREMENT CONDITIONS		
Average Voltage	119.90 ± 0	VAC
Average Current	0.15 ± 0	A
Average Power	17.60 ±	W
Power Factor	0.48 ± 0	-
Apparent Power	8.47 ± 0	VA
Crest Factor	±	
Frequency	60.00 ± 0	Hz
Amb Temp ^{*3}	22.9 ± 1.6	°C
Case Temp	62.0 ± 0.35338	°C
Humidity	29.00% ± 2.00%	-
Configuration	Type C Goniometer	-
Orientation ^{*1}	Horizontal	(Fig 1)

DUT TOTAL OPERATION TIME	
Pre Run Time	Not Available
Stabilization	0:55:00.000
Measurement	0:55:42.000
Post Run Time	

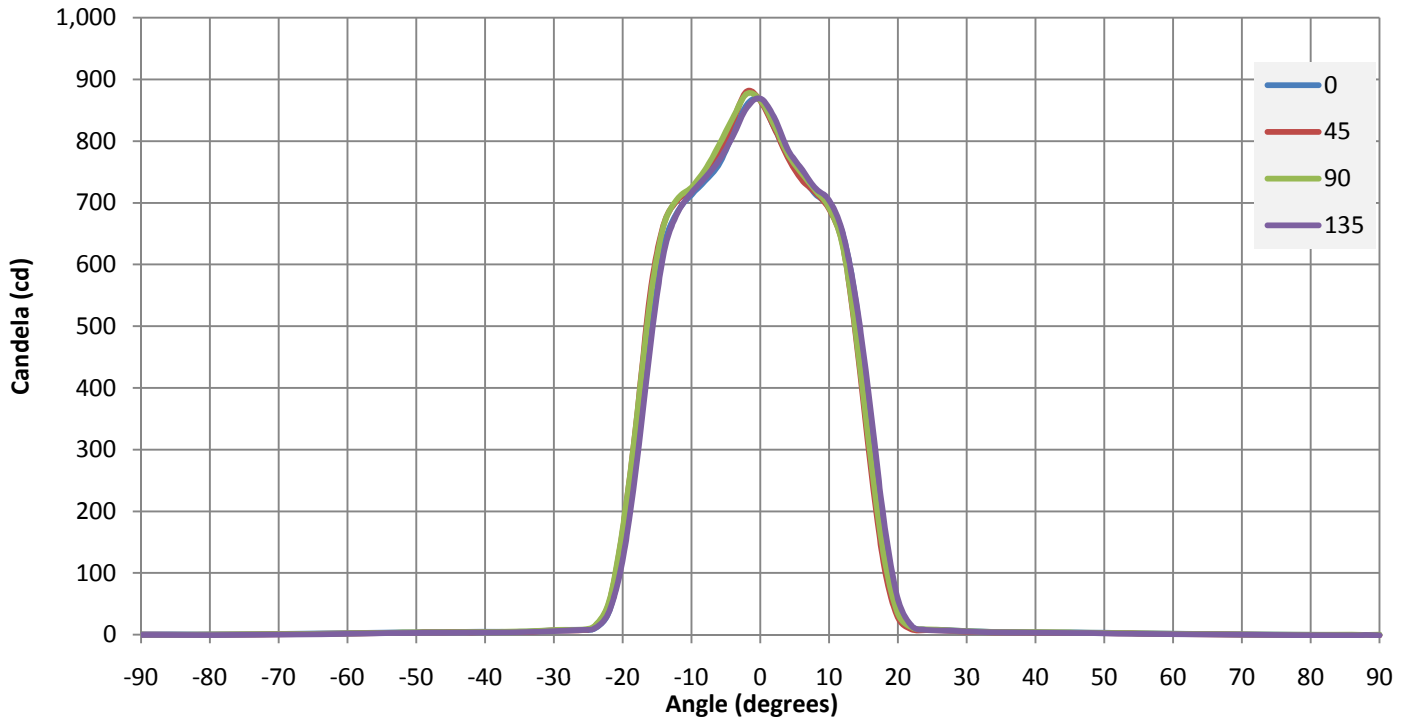
ADDITIONAL TEST INFORMATION		
x-axis Alignment	0.0 ± 5	mm
y-axis Alignment	0.0 ± 5	mm
z-axis Alignment	500.0 ± 1.00	mm
Theta Minimum	0.00 ± 0.10	Degree
Theta Maximum	135.00 ± 0.10	Degree
Theta Step Size	45.00 ± 0.10	Degree
Phi Minimum	-90.00 ± 0.10	Degree
Phi Maximum	90.00 ± 0.10	Degree
Phi Step Size	2.00 ± 0.10	Degree



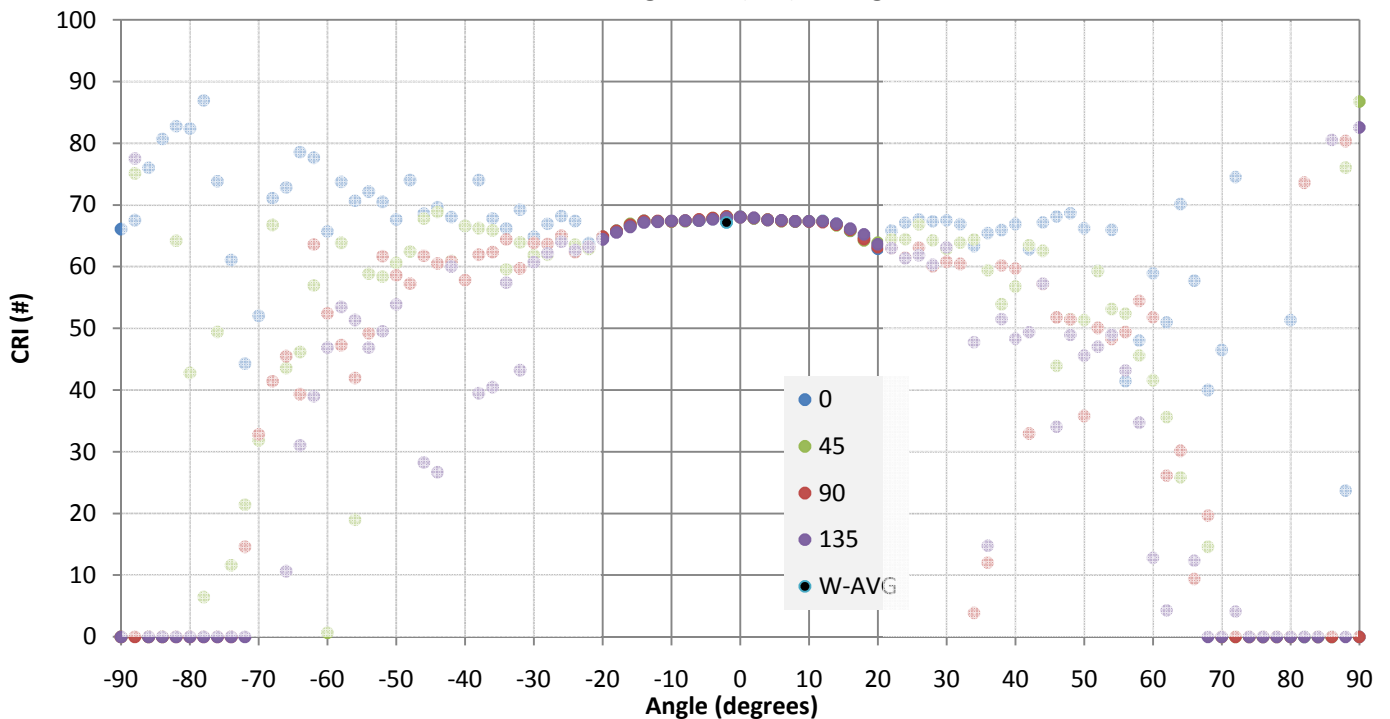
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Luminous Intensity Distribution (cd) vs Angle



Color Rendering Index (CRI) vs Angle

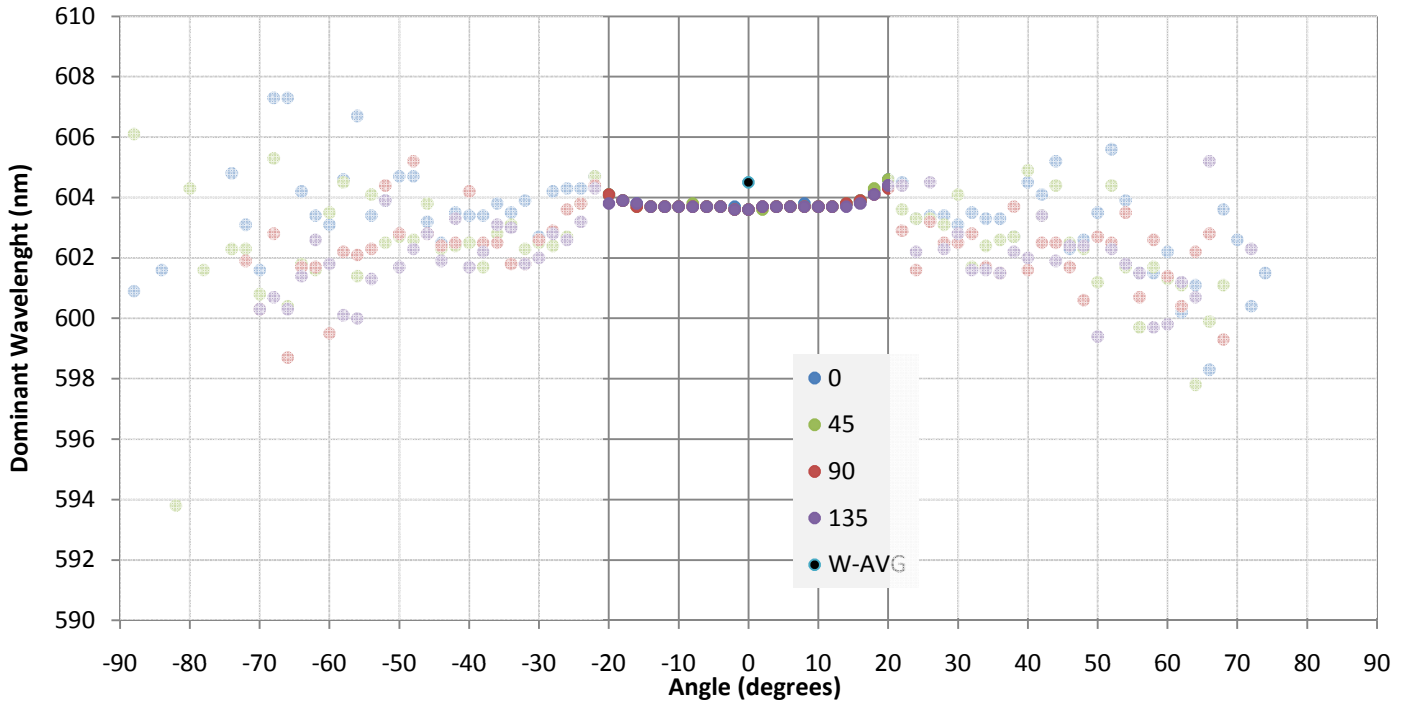




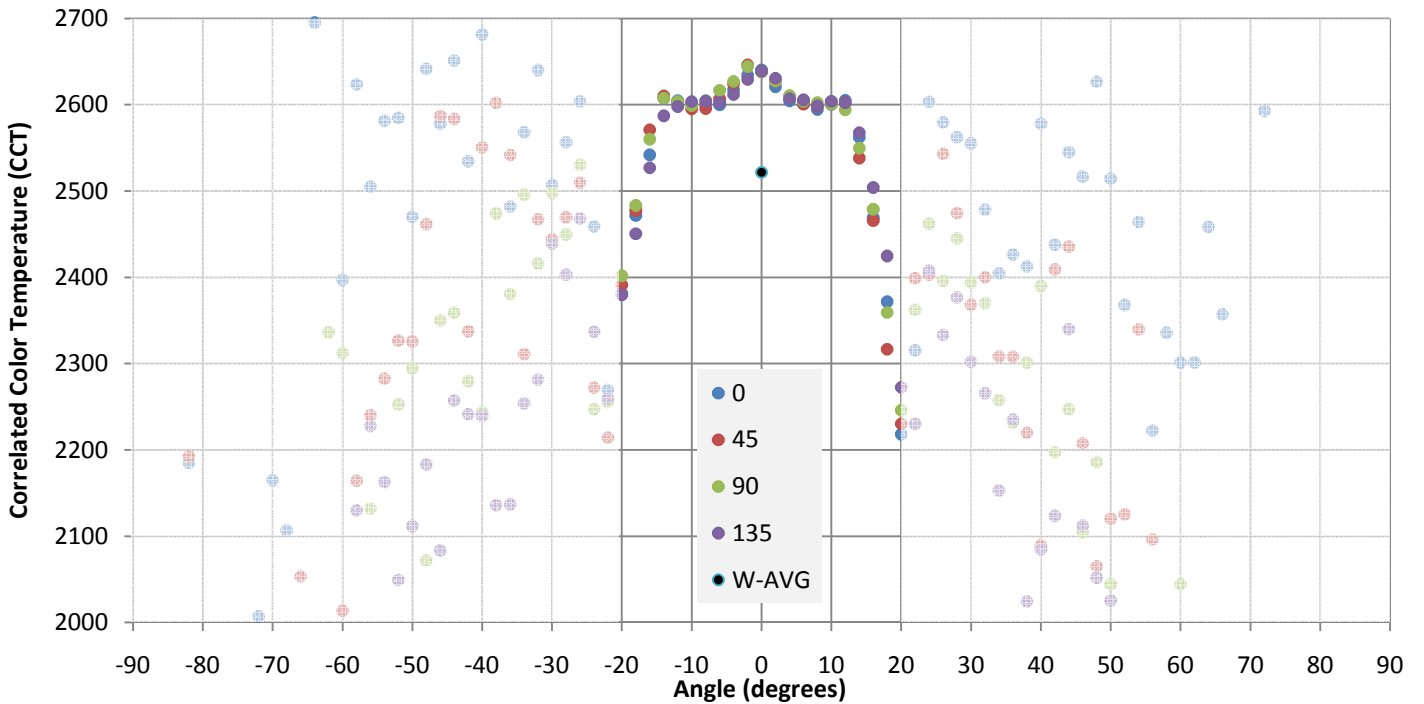
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Dominant Wavelength vs Angle



Correlated Color Temperature (CCT) vs Angle

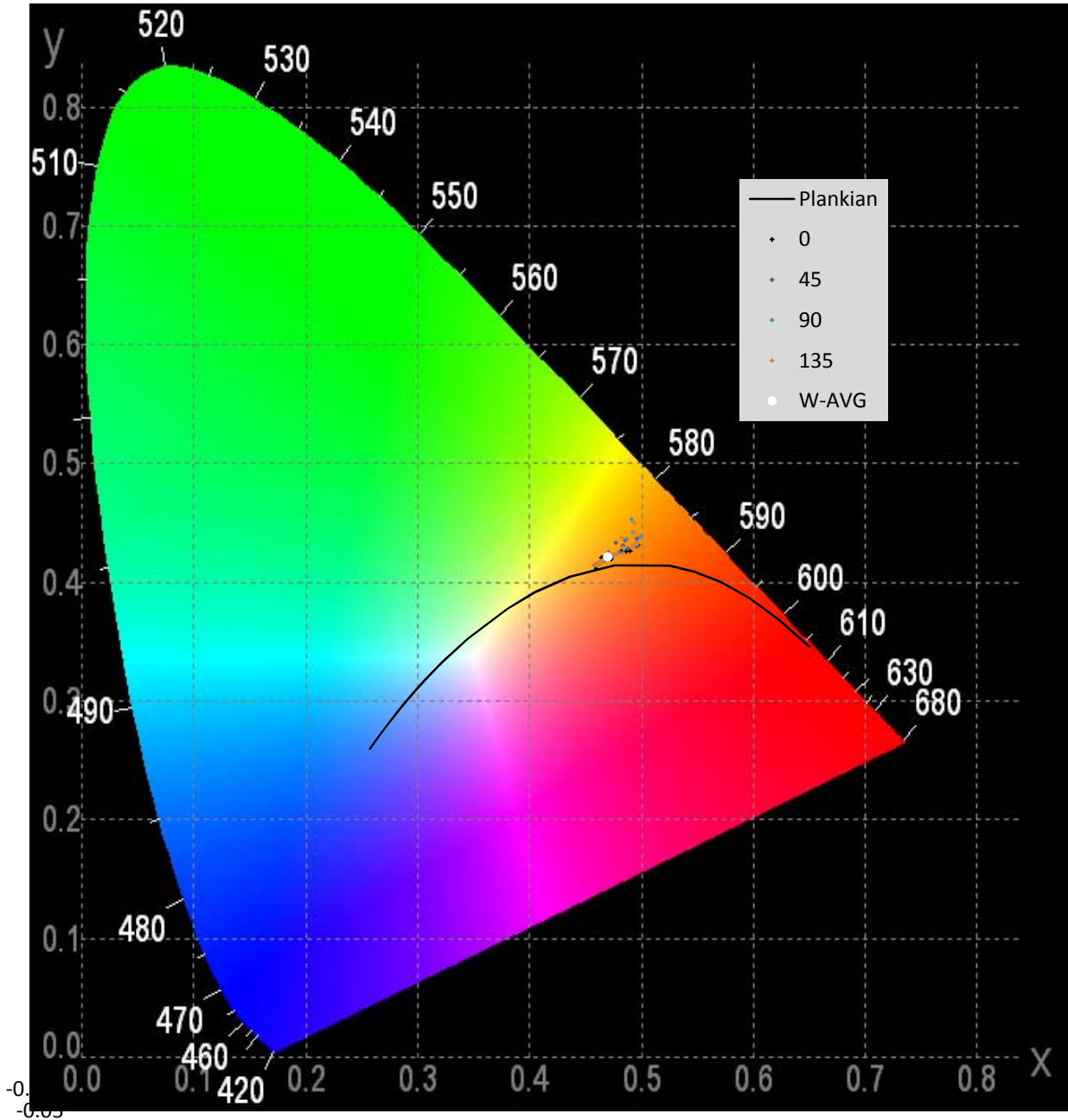




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CIE1931 Chromaticity Diagram

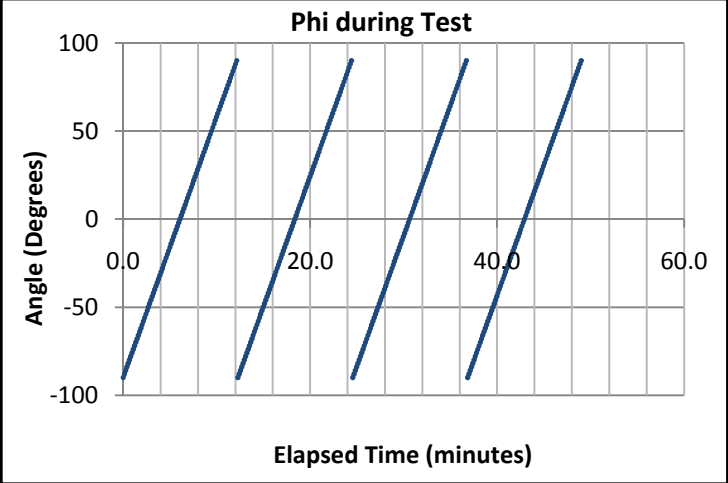
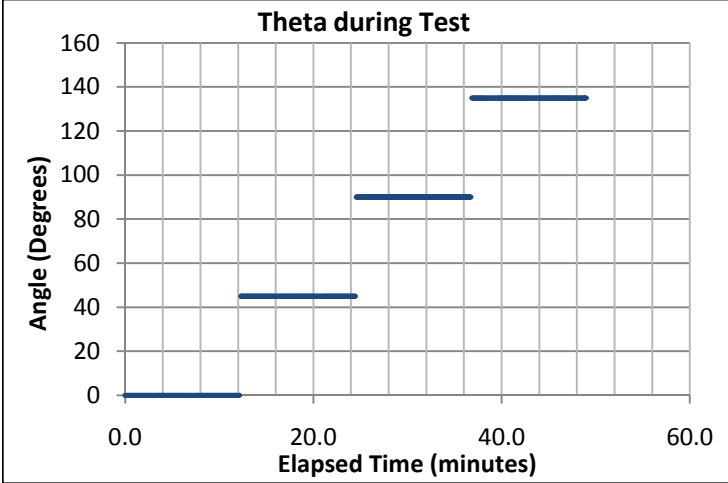
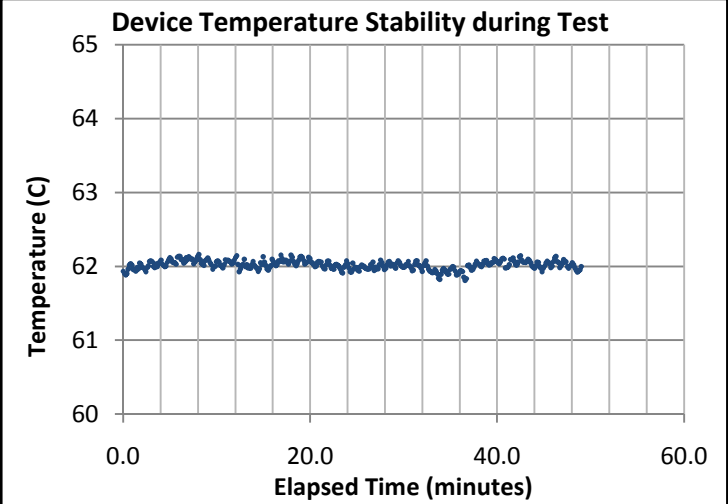
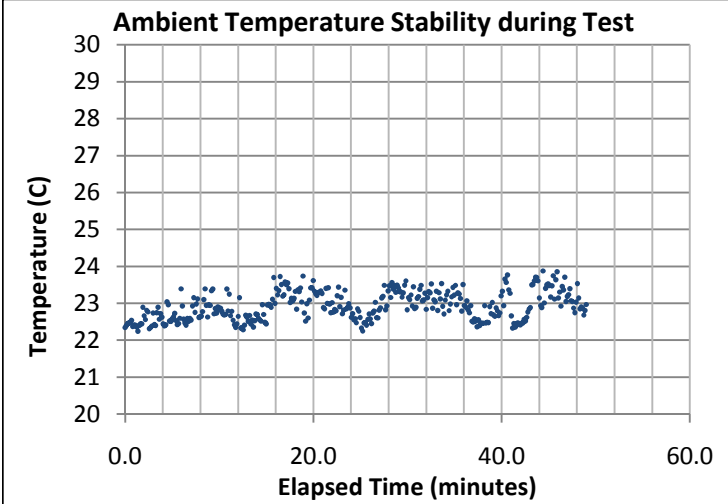




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Device Stability During Test

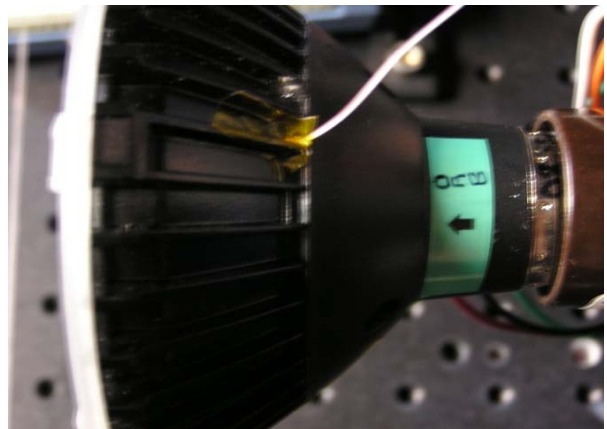
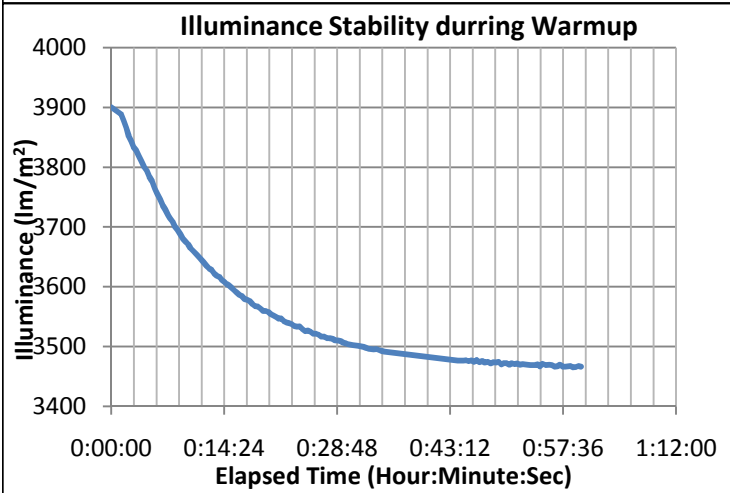
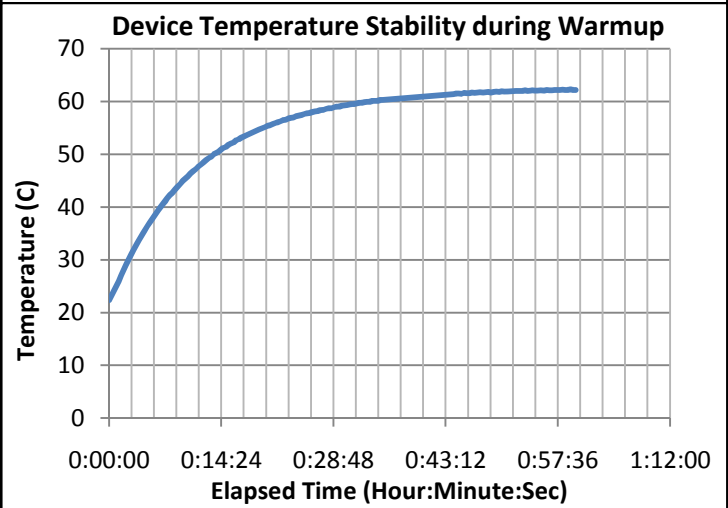
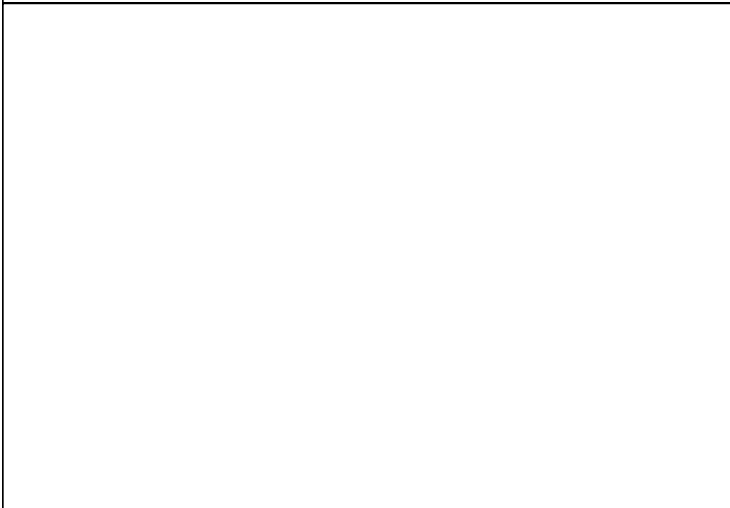




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Device Stability During Warmup



Location of type J Thermocouple

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INSTRUMENTATION USED					
Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
Spectroradiometer	Orb Optronix	SP-100	2908028	9/24/2009	9/24/2010
Regulated Power Supply	Agilent	E3634A	MY4011432	-	-
2-Axis Type C Goniometer	Prototype, NA	-	-	-	-

REFERENCE STANDARD USED	
Luminance	Standard luminance source: OL-455 of Optronic Laboratories Inc. Luminance Calibration Source OL-455-5-1 S/N: 03101043 Calibration Source Controller OL-450 S/N: 03602509
Irradiance	Standard illuminance source: OL-200M of Optronic Laboratories Inc. Irradiance Calibration Source OL-200M S/N: 1036 Calibration Source Controller OL-83A S/N: 07220256

ADDITIONAL NOTES	
*1	Fixture tested normal to intended orientation. Testing in this orientation may yield results different to those obtained from the normal operating position.
	Greyed out areas on angular plots refer to color math calculated under 1% peak Irradiance.