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

Prepared By: TJ
INITIALS ONLY

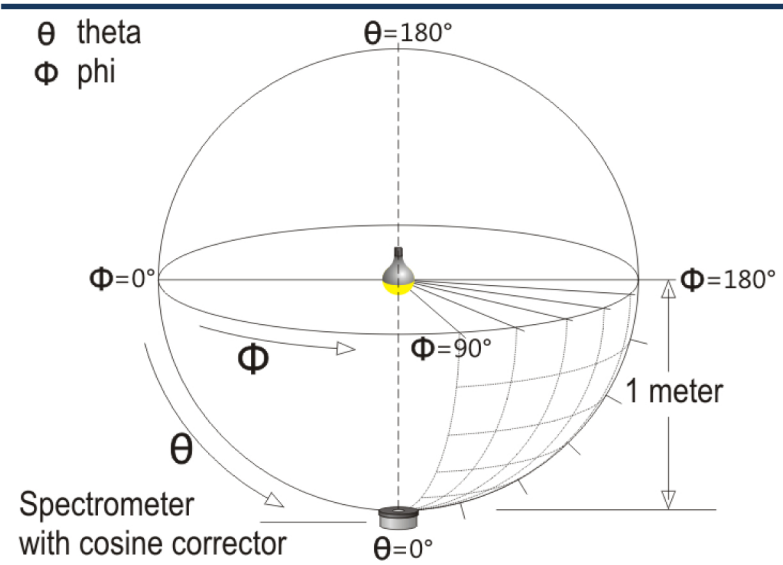
Device Ref #: P20-L360-C27-B25
Date Issued: 4/16/2011
Date Tested: 3/19/2011

CUSTOMER INFORMATION:

Job Number: VERM001
Test Report: LM-79 Goniometer

Prepared for: Verbatim
1200 West W.T. Harris Blvd
Charlotte NC, 28262-8536

Evaluation For: P20-L360-C27-B25
p/n: 97585



The image to the left illustrates the geometry of the type C goniometer measurement. Optical measurements are made via a spectrometer located 1 meter from the centrial axis.of the lamp. The lamp is rotated Φ = 0 to 360° and the spectrometer is swept from θ = 0 to 90°.

Measurement Geometry for Type-C Spectral-Goniometer

Lamp Mounted on Goniometer as Tested

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RADIOMETRIC & PHOTOMETRIC MEASUREMENT RESULTS [1]					
Total Integrated Radiant Flux	1.2		W	Chromaticity Coordinates	
Total Integrated Luminous Flux	360.3		lm	x	0.4647
Luminous Efficacy	37.7		lm/W	y	0.4166
Peak Wavelength	606.7		nm	u	0.2629
Dominant Wavelength	583.7		nm	v	0.3535
Color Purity	64.6		%	u'	0.2629
CCT	2684		K	v'	0.5303
CRI Ra	77.24			Delta uv	0.0017
Peak Candela	1133.7		cd		

MANUFACTURER SPECIFICATIONS		
Voltage	120.0	VAC
Current	-	
Power	9.3	W
Frequency	-	Hz
Dimmable	Yes	
Orientation		
Color Temperature	2700	K
Emitter	-	Deg
Operating Freq.	-	Hz

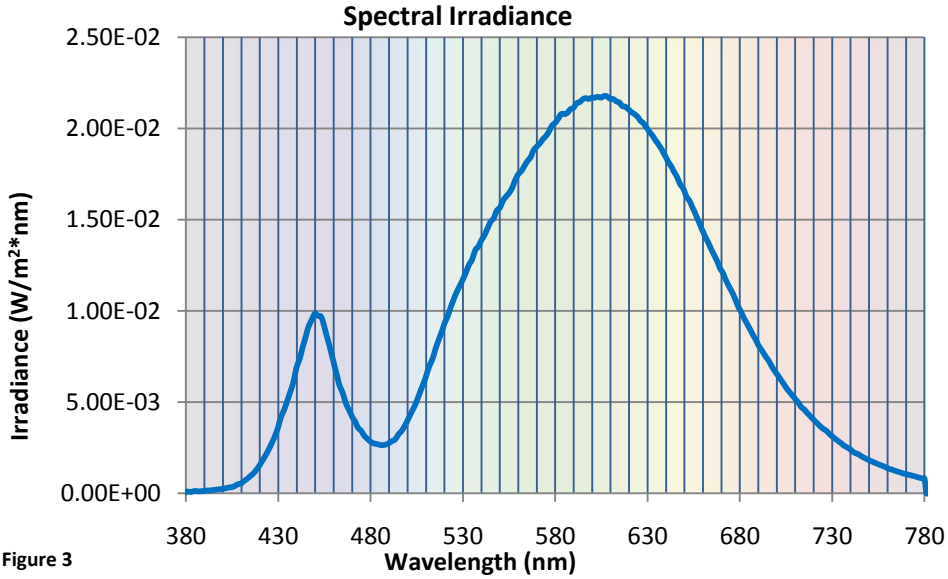

Figure 3

DUT MEASUREMENT CONDITIONS		
Average Voltage	120.07	VAC
Average Current	0.100	A
Apparent Power	11.95	VA
Power Factor	0.80	
Active Power	9.55	W
Frequency	60.03	Hz
Ambient Temp	21.2	°C
Device Temp	62.9	°C
Humidity	29.8	%
Configuration	Type C	
Orientation	Base Up	

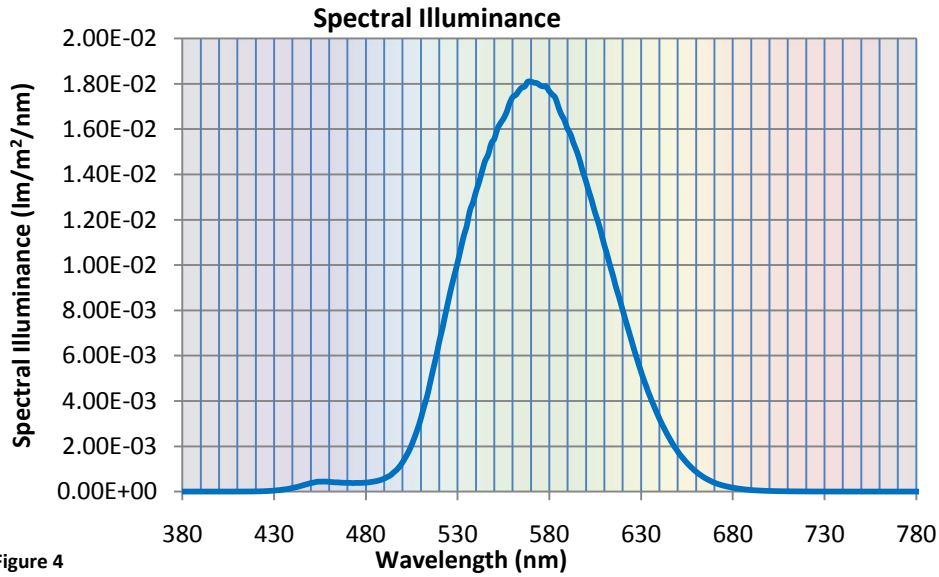

Figure 4

ADDITIONAL TEST INFORMATION		
x-axis Alignment	0.0 ± 2	mm
y-axis Alignment	0.0 ± 2	mm
z-axis Alignment	1.0 ± 0.005	m
Theta Minmum	0.00 ± 0.10	Deg
Theta Maximum	337.50 ± 0.10	Deg
Theta Step Size	22.50 ± 0.10	Deg
Phi Minimum	0.00 ± 0.10	Deg
Phi Maximum	75.00 ± 0.10	Deg
Phi Step Size	2.50 ± 0.10	Deg

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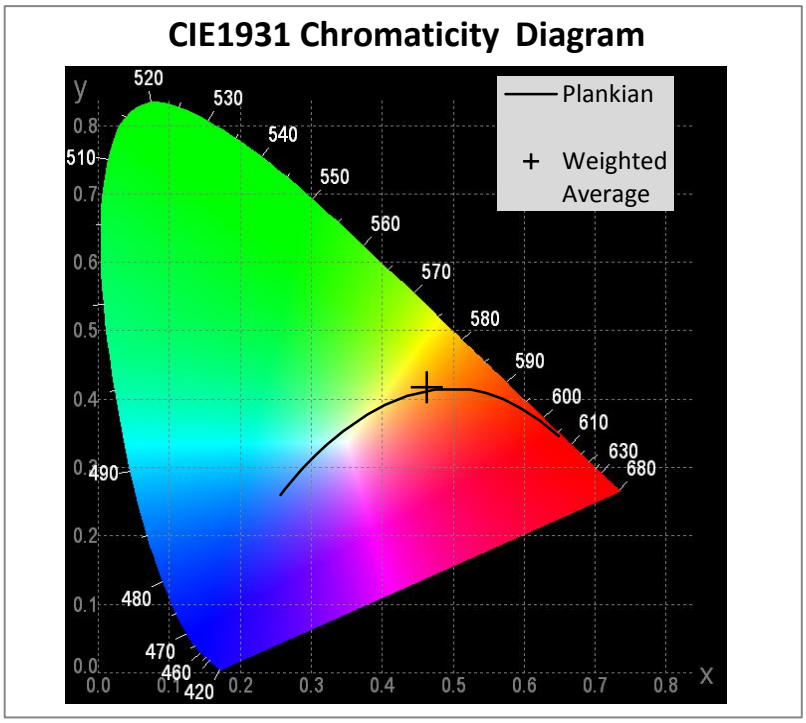
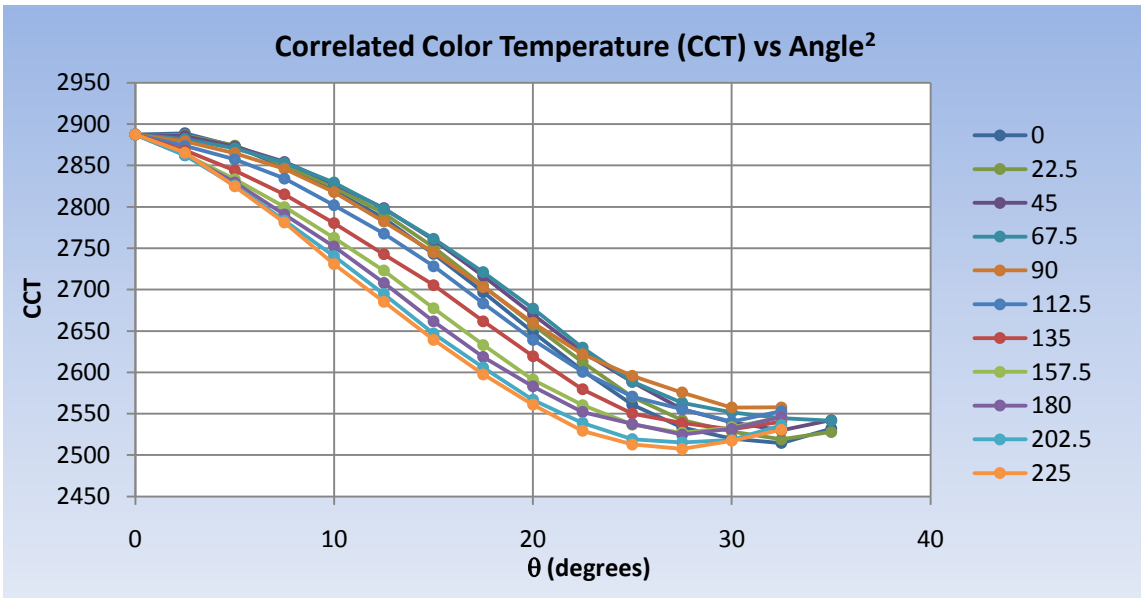
Chromaticity and Color Plots





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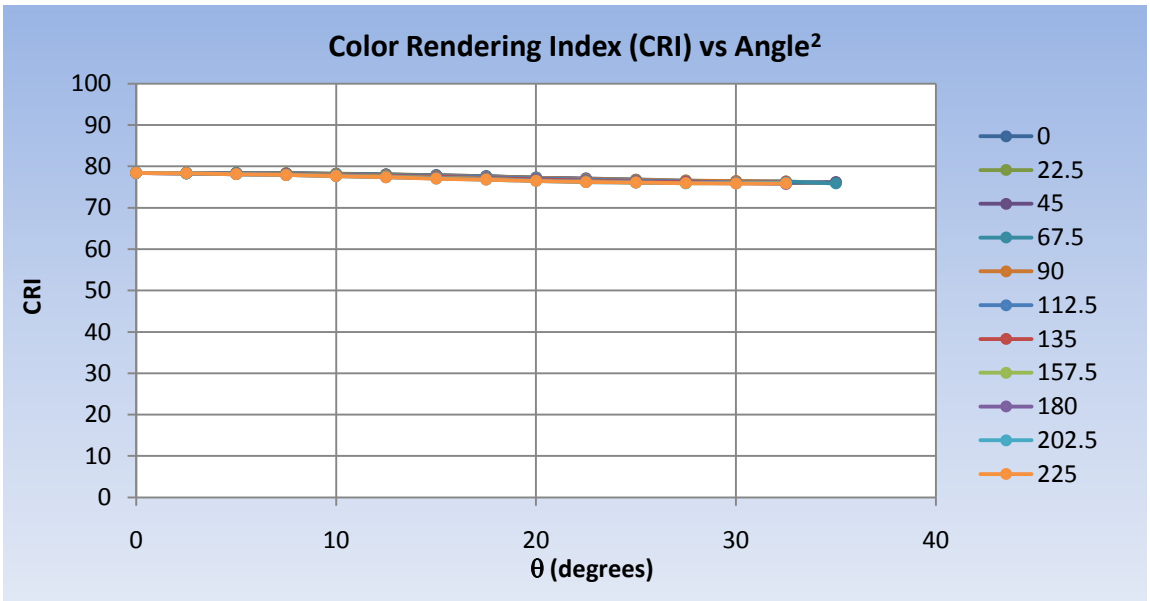

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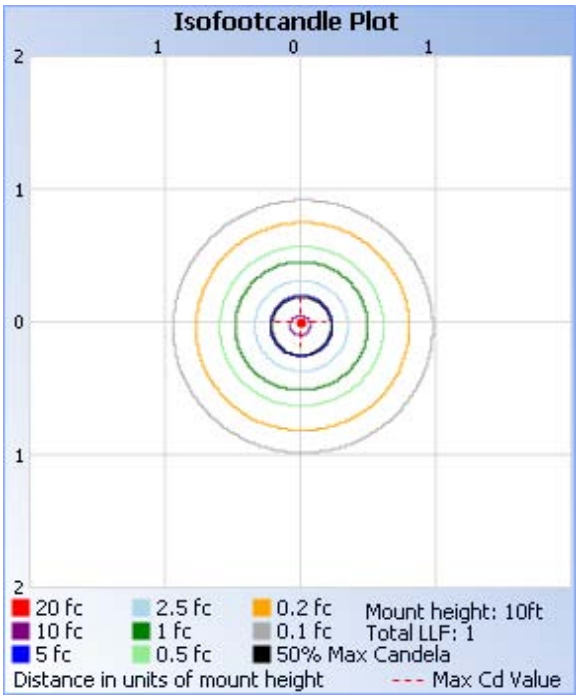
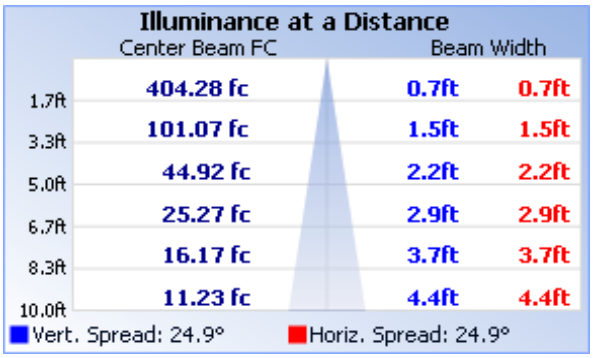
Zonal Lumen Summary

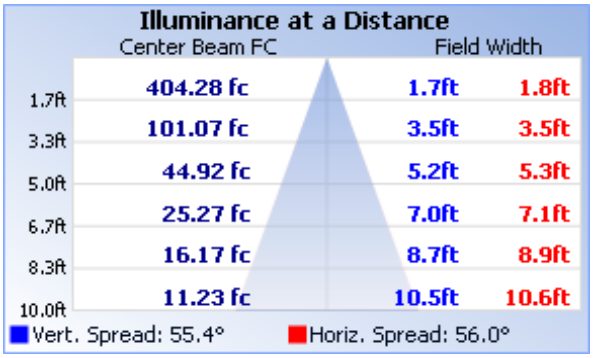
Lumens Per Zone		
Zone	**Lumens**	**% Total**
0-10	82.4	23.1%
10-20	120.9	33.9%
20-30	71.5	20.0%
30-40	34.8	9.8%
40-50	19.2	5.4%
50-60	13.8	3.9%
60-70	10.4	2.9%
70-80	3.8	1.1%
80-90	0	0.0%
Total	**356.8**	**100%**

Zonal Lumen Summary		
Zone	**Lumens**	**% Lamp**
0-30	274.8	77.0%
0-40	309.6	86.8%
0-60	342.6	96.0%
60-90	14.2	4.0%
70-100	3.8	1.1%
90-120	0	0.0%
0-90	356.8	100%
90-180	0	0%
0-180	356.8	100%

Illuminanace Plots







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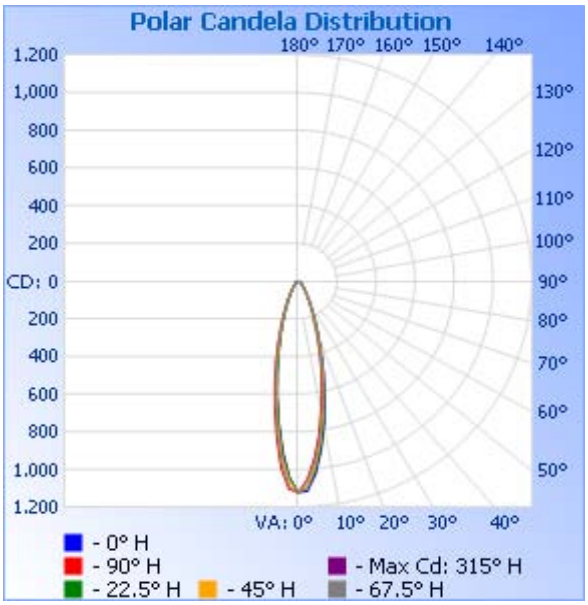
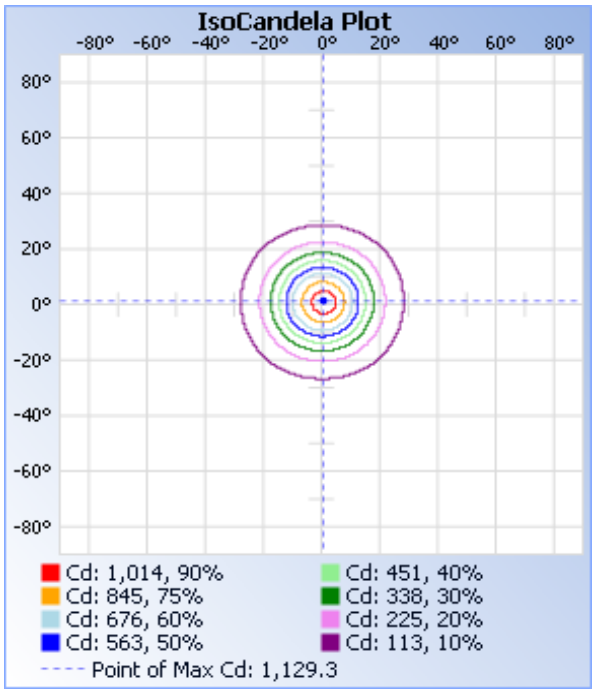
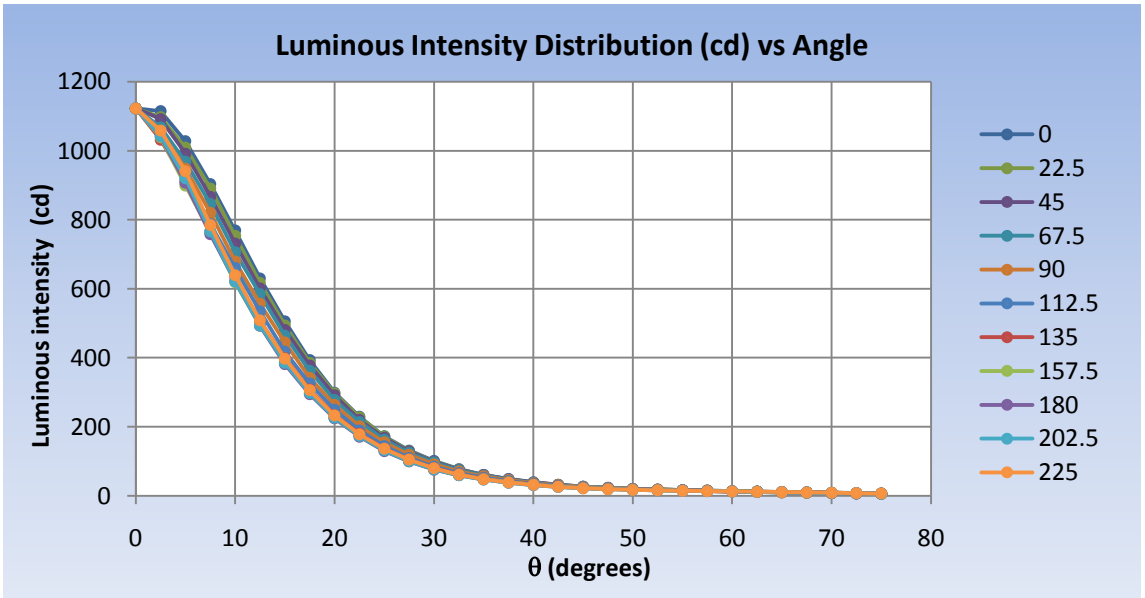
Candela Plots







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INSTRUMENTATION USED - Goniometric measurement					
Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
Spectrometer	Orb Optronix	SP-75	2009064	2/12/2011	4/12/2011
Regulated Power Supply	Elgar	CW801	0910A00133	-	-
Digital Power Meter	Yokogawa	760401	91L122464	1/5/2011	1/5/2012
2-Axis Type C Goniometer	Orb Optronix	MS-STA-GON-C-01		-	-

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 irradiance 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	Unless specified otherwise, reported values are averages over all measurement angles weighted by the luminous flux. Testing performed is in compliance with IESNA LM-79.
*2	Data points corresponding to less than 10% of peak flux values are not displayed.

END OF REPORT

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