



FOR THE SCOPE OF
ACCREDITATION UNDER NVLAP
LAB CODE 200849-0

TEST REPORT

Job No. 160600083SHA

Date: June 12, 2016

REPORT NO. 160600083SHA-004

TEST OF ONE LED LAMP
MODEL NO. 910XX, 91063

RENDERED TO
P.Q.L., Inc.
2285 Ward Avenue / Simi Valley, CA 93065

TEST: Electrical and Photometric as required to the IESNA LM-79 test standard.

LABORATORY NOTE: The laboratory that conducted the testing detailed in this report has been Qualified, Verified, and Recognized for LM-79 Testing for ENERGY STAR for Luminaires by NVLAP program.

AUTHORIZATION: The testing performed was authorized by signed quote number QSH160517064.

STANDARDS USED: The following American National Standards or Illuminating Engineering Society of North America Test Guides were used in part or totally to test each specimen:
NEMA ANSLG C78.377: 2008 Specifications of the Chromaticity of Solid State Lighting Products
IESNA LM-79: 2008 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products

DESCRIPTION OF SAMPLE: The client submitted three samples of model 910XX, 91063, 910XX. The samples were received by Intertek on May 31, 2016, in undamaged condition, and one sample was tested as received. The samples designations were 0160531-14-001~0160531-14-004.

DATES OF TESTS: May 31, 2016 through June 12, 2016

ISSUED BY: Intertek Testing Services Shanghai

TEST LOCATION: 7 floor, No.51, 1089 Qinzhou Road (North), Shanghai, China 200233

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SUMMARY

Model Number :	910XX, 91063
Description :	LED Lamp

Test Condition: 120V 60Hz for 910XX

Criteria	Result
Total Lumen Output	831.82lm
Total Power	8.91W
Luminaire Efficacy	93.36lm/W
Power Factor	0.8057
Correlated Color Temperature (CCT)	2792K
Color Rendering Index (CRI)	81.2
Chromaticity Coordinate (x)	0.4504
Chromaticity Coordinate (y)	0.4050
Chromaticity Coordinate (u')	0.2589
Chromaticity Coordinate (v')	0.5238

Test Condition: 120V 60Hz for 91063

Criteria	Result
Total Lumen Output	878.71lm
Total Power	8.99W
Luminaire Efficacy	97.65lm/W
Power Factor	0.8060
Correlated Color Temperature (CCT)	3140K
Color Rendering Index (CRI)	83.1
Chromaticity Coordinate (x)	0.4246
Chromaticity Coordinate (y)	0.3947
Chromaticity Coordinate (u')	0.2466
Chromaticity Coordinate (v')	0.5158

Test Condition: 120V 60Hz for 910XX

Criteria	Result
Total Lumen Output	880.54lm
Total Power	9.18W
Luminaire Efficacy	95.94lm/W
Power Factor	0.8522
Correlated Color Temperature (CCT)	4132K
Color Rendering Index (CRI)	83.1
Chromaticity Coordinate (x)	0.3748
Chromaticity Coordinate (y)	0.3731
Chromaticity Coordinate (u')	0.2228
Chromaticity Coordinate (v')	0.4991

***** End of Page *****



SUMMARY

Model Number :	910XX, 91063
Description :	LED Lamp

Test Condition: 120V 60Hz for 910XX

Criteria	Result
Total Lumen Output	861.43lm
Total Power	9.17W
Luminaire Efficacy	93.97lm/W
Power Factor	0.8495
Correlated Color Temperature (CCT)	5043K
Color Rendering Index (CRI)	85.4
Chromaticity Coordinate (x)	0.3440
Chromaticity Coordinate (y)	0.3524
Chromaticity Coordinate (u')	0.2104
Chromaticity Coordinate (v')	0.4849



EQUIPMENT LIST

Equipment Used	Model Number	Control Number
Fluke Temperature Meter	52	EC2357
Everfine- DC Power Supply	WY12010	EC4753-7
Everfine- AC power source for Integrating Sphere System	VPS1010 PWM	EC4760-12
Everfine - AC power source for Goniophotometer System	VPS1060 PWM	EC4753-8
Two meter integrating sphere unit	Everfine – 2M	EC4760
Everfine - Digital Power Meter	PF2010A	EC4760-10
YOKOGAWA - Digital Power Meter	WT210	EC4553
Everfine – Goniophotometer	Go-R5000	EC4753

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TEST METHOD

Seasoning in Sample Orientation – LED Products

No seasoning was performed in accordance with IESNA LM-79

Light Distribution and Output Measurements

Light Distribution and total light output (luminous flux) were measured using a Go-R5000 Type-C Rotating Mirror Goniophotometer. Temperature 25°C and relative humidity of 60% was measured at a position in the testing laboratory.

The lamp rotates only around the fixed vertical axle in the prescribed burning position. The lamp and mirror permit the measurement of luminous intensity at the direction of any horizontal or vertical angle without tilting the lamp. The lamp was allowed to stabilize before measurements were made.

Chromaticity Measurements

Chromaticity was measured using a 2 meters integrating sphere spectral lamp measurement system. Temperature was measured at a position inside the sphere shielded from direct light. Relative humidity of 65% was measured at a position in the testing laboratory.

Spectral radiant flux measurements were made using spectroradiometer attached to the detector port of the integrating sphere. Each lamp was allowed to stabilize before measurements were made. The calibration of the integrating sphere spectroradiometer system is by the reference/standard lamps which are traceable to National Institute of Metrology P.R. CHINA. Lamp efficacy (lumens per watt) for each lamp model was then computed based on the luminous flux result. Electrical measurements including voltage, power and power factor were measured using YOKOGAWA - Digital Power Meter., model WT210.

Standard lamp used:
Model: Labsphere SCL-1400
Current: 2.679A

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RESULTS OF TESTS

Test Condition: 120V 60Hz for 910XX

Total operation burning time: 70 min
Stabilization time: 60 min

Photometric Measurements at 25°C

Intertek Sample No.	Base Orientation	Correlated Color Temperature (K)	CRI	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
910XX							
0160531-14-001	N/A	2792	81.2	0.4504	0.4050	0.2589	0.5238

Photometric and Electrical Measurements at 25°C

Intertek Sample No.	Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
910XX							
0160531-14-001	N/A	120	92.1	8.91	0.8057	831.82	93.36

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens (lm)	% Luminaire (%)
910XX		
0-30	82.93	9.97
0-40	144.47	17.37
0-60	302.44	36.36
0-90	558.78	67.18
60-90	256.34	30.82
0-180	831.82	100

Beam Angle

	Horizontal Spread (°)	Vertical Spread (°)
910XX		
Beam (50%)	228.8	229.3

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RESULTS OF TESTS

Test Condition: 120V 60Hz for 91063

Total operation burning time: 70 min
Stabilization time: 60 min

Photometric Measurements at 25°C

Intertek Sample No.	Base Orientation	Correlated Color Temperature (K)	CRI	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
91063							
0160531-14-002	N/A	3140	83.1	0.4246	0.3947	0.2466	0.5158

Photometric and Electrical Measurements at 25°C

Intertek Sample No.	Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
91063							
0160531-14-002	N/A	120	93.0	8.99	0.8060	878.71	97.65

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens (lm)	% Luminaire (%)
91063		
0-30	89.53	10.19
0-40	155.63	17.71
0-60	324.14	36.89
0-90	594.48	67.65
60-90	270.34	30.76
0-180	878.71	100

Beam Angle

	Horizontal Spread (°)	Vertical Spread (°)
91063		
Beam (50%)	224.8	225.0

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RESULTS OF TESTS

Test Condition: 120V 60Hz for 910XX

Total operation burning time: 70 min
Stabilization time: 60 min

Photometric Measurements at 25°C

Intertek Sample No.	Base Orientation	Correlated Color Temperature (K)	CRI	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
910XX							
0160531-14-003	N/A	4132	83.1	0.3748	0.3731	0.2228	0.4991

Photometric and Electrical Measurements at 25°C

Intertek Sample No.	Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
910XX							
0160531-14-003	N/A	120	89.7	9.18	0.8522	880.55	95.94

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens (lm)	% Luminaire (%)
910XX		
0-30	86.48	9.82
0-40	150.80	17.13
0-60	316.68	35.96
0-90	587.84	66.76
60-90	271.16	30.8
0-180	880.54	100

Beam Angle

	Horizontal Spread (°)	Vertical Spread (°)
910XX		
Beam (50%)	233.0	230.4

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RESULTS OF TESTS

Test Condition: 120V 60Hz for 910XX

Total operation burning time: 70 min
Stabilization time: 60 min

Photometric Measurements at 25°C

Intertek Sample No.	Base Orientation	Correlated Color Temperature (K)	CRI	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
910XX							
0160531-14-004	N/A	5043	85.4	0.3440	0.3524	0.2104	0.4849

Photometric and Electrical Measurements at 25°C

Intertek Sample No.	Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
910XX							
0160531-14-004	N/A	120	89.9	9.17	0.8495	861.43	93.97

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens (lm)	% Luminaire (%)
910XX		
0-30	84.96	9.86
0-40	148.09	17.19
0-60	310.61	36.06
0-90	575.69	66.83
60-90	265.68	30.87
0-180	861.43	100

Beam Angle

	Horizontal Spread (°)	Vertical Spread (°)
910XX		
Beam (50%)	232.1	233.0

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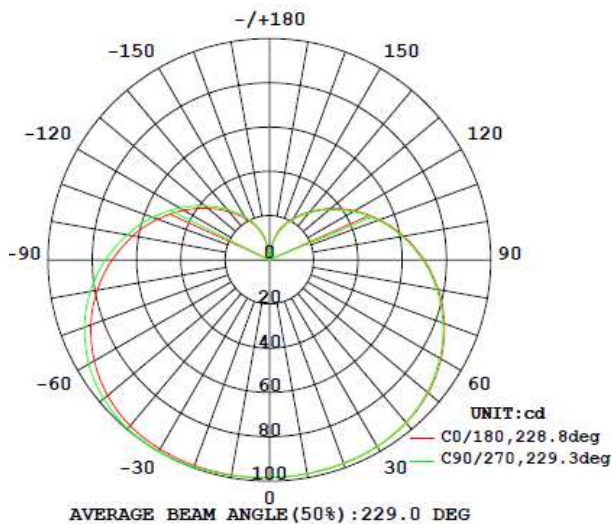


RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary at 25°C – Candelas

Test Condition: 120V 60Hz for 910XX

V \ H(°)	0	22.5	45	67.5	90
0	98.42	98.42	98.42	98.42	98.42
5	98.66	98.53	98.47	98.45	98.30
10	98.98	98.89	98.51	98.50	98.21
15	99.27	98.93	98.46	98.43	98.07
20	99.60	99.25	98.74	98.57	97.98
25	99.81	99.28	98.71	98.57	97.72
30	99.97	99.43	98.55	98.31	97.43
35	99.91	99.32	98.37	97.91	96.92
40	99.59	98.94	97.97	97.18	96.11
45	98.85	98.12	97.05	96.18	94.98
50	97.70	96.96	95.71	94.89	93.48
55	96.21	95.36	94.13	93.06	91.74
60	94.23	93.29	91.93	90.87	89.47
65	91.68	90.89	89.50	88.37	86.92
70	88.87	87.97	86.46	85.54	84.04
75	85.70	84.84	83.38	82.36	80.97
80	82.11	81.28	79.99	78.89	77.46
85	78.22	77.41	76.14	75.10	73.69
90	74.03	73.29	72.19	71.21	69.96



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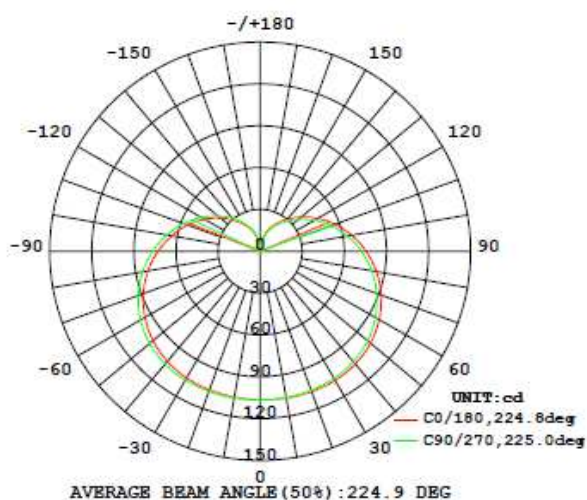


RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary at 25°C – Candelas

Test Condition: 120V 60Hz for 91063

V \ H(°)	0	22.5	45	67.5	90
0	106.56	106.56	106.56	106.56	106.56
5	106.73	106.78	106.95	106.74	106.72
10	106.87	106.94	107.00	107.03	106.89
15	106.98	107.01	107.17	107.27	106.98
20	107.18	107.28	107.16	107.23	107.35
25	106.98	107.15	107.45	107.22	107.05
30	106.88	106.83	107.13	106.89	106.90
35	106.60	106.43	106.67	106.70	106.40
40	105.64	105.84	106.02	105.93	105.54
45	104.39	104.70	104.92	104.76	104.31
50	102.95	103.25	103.28	103.21	102.82
55	100.98	101.13	101.10	101.08	100.51
60	98.50	98.78	98.83	98.85	97.99
65	95.65	95.97	96.20	95.87	94.90
70	92.45	92.76	92.92	92.48	91.86
75	88.91	89.20	89.31	88.98	88.02
80	85.06	85.37	85.36	84.98	84.09
85	80.97	81.22	81.24	80.77	79.93
90	76.64	76.86	76.73	76.40	75.39



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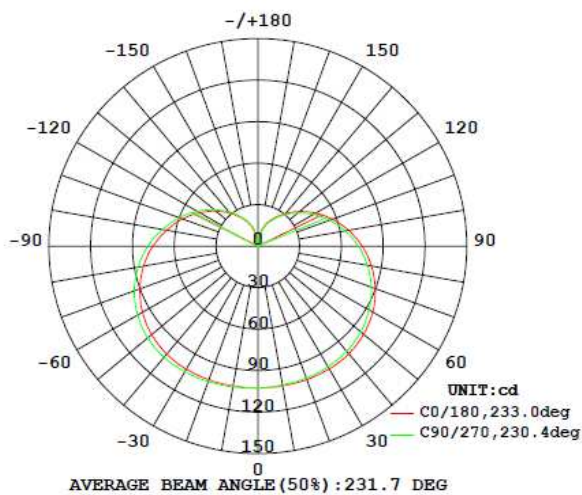


RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary at 25°C – Candelas

Test Condition: 120V 60Hz for 910XX

V \ H(°)	0	22.5	45	67.5	90
0	102.54	102.54	102.54	102.54	102.54
5	102.89	102.89	102.69	102.68	102.54
10	103.29	103.28	103.01	102.88	102.66
15	103.73	103.65	103.34	103.07	102.71
20	104.21	104.05	103.64	103.22	102.73
25	104.63	104.42	103.89	103.38	102.57
30	104.93	104.66	103.99	103.37	102.54
35	105.02	104.75	103.89	103.19	102.10
40	104.85	104.49	103.56	102.69	101.70
45	104.25	103.84	102.83	101.85	100.48
50	103.22	102.72	101.69	100.61	99.10
55	101.73	101.16	100.12	98.91	97.38
60	99.68	99.17	98.00	96.79	95.37
65	97.27	96.66	95.46	94.23	92.79
70	94.39	93.80	92.56	91.29	89.83
75	91.08	90.54	89.29	87.97	86.40
80	87.31	86.80	85.66	84.34	82.81
85	83.34	82.77	81.71	80.43	78.99
90	79.04	78.49	77.49	76.29	74.89



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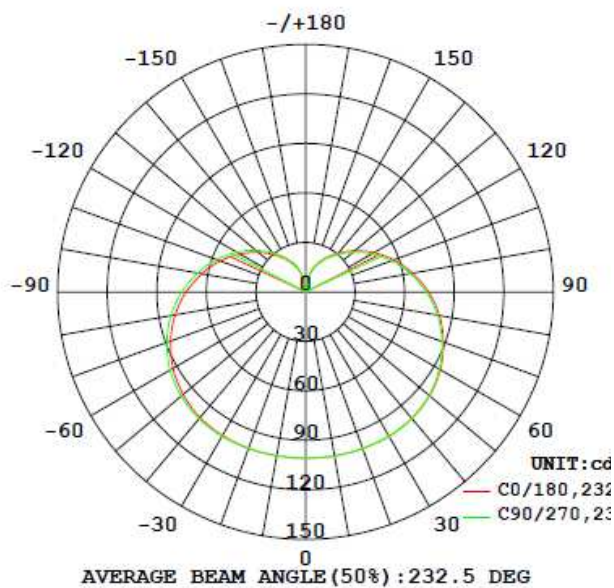


RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary at 25°C – Candelas

Test Condition: 120V 60Hz for 910XX

V \ H(°)	0	22.5	45	67.5	90
0	100.80	100.80	100.80	100.80	100.80
5	100.80	100.86	100.85	100.84	100.80
10	100.85	100.93	100.89	100.91	100.96
15	100.92	101.01	100.99	101.01	101.01
20	100.96	101.09	101.08	101.04	101.05
25	101.03	101.13	101.12	101.04	101.02
30	101.03	101.09	101.03	100.96	100.96
35	100.84	100.85	100.72	100.70	100.73
40	100.36	100.47	100.26	100.19	100.14
45	99.52	99.64	99.41	99.30	99.22
50	98.27	98.36	98.22	98.06	97.93
55	96.69	96.71	96.56	96.45	96.27
60	94.67	94.67	94.54	94.41	94.17
65	92.18	92.22	92.10	91.98	91.66
70	89.35	89.43	89.29	89.19	88.78
75	86.23	86.26	86.14	86.00	85.64
80	82.74	82.78	82.65	82.53	82.16
85	78.95	79.01	78.92	78.78	78.42
90	74.92	75.00	74.92	74.82	74.43



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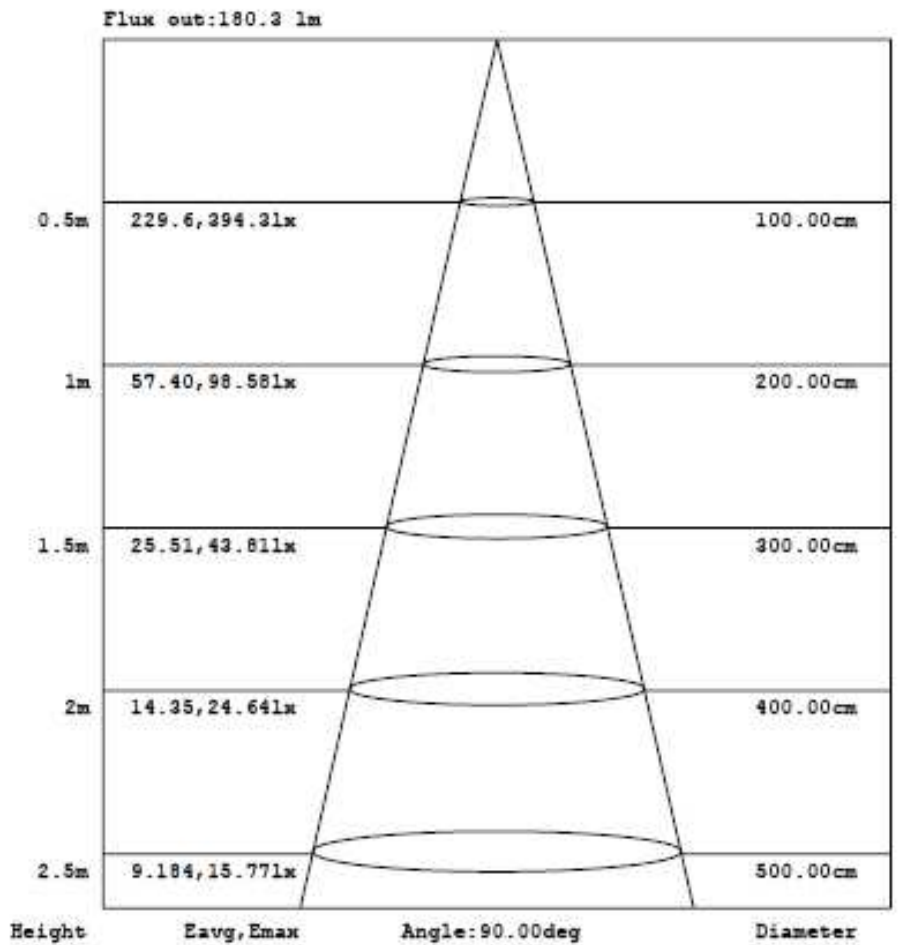
RESULTS OF TESTS (cont'd)

Test Condition: 120V 60Hz for 910XX

Illumination Plots

Model No.: 910XX
Mount Height: 2.5 m

Illuminance - Cone of Light



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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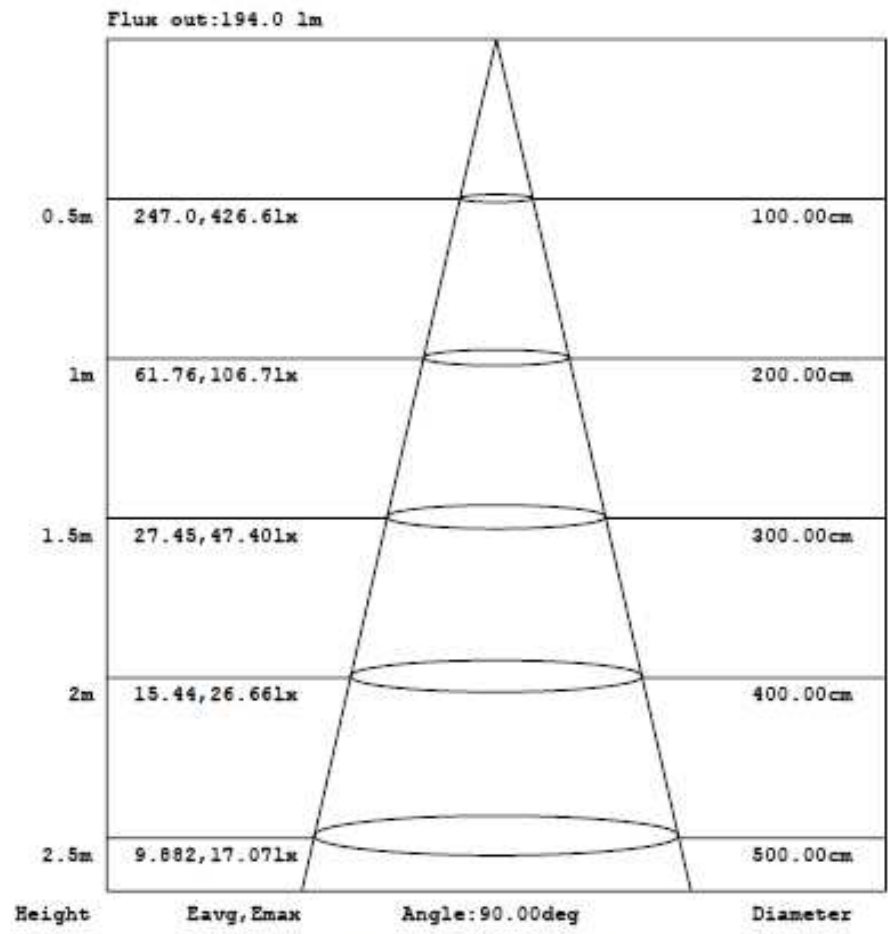
RESULTS OF TESTS (cont'd)

Test Condition: 120V 60Hz for 91063

Illumination Plots

Model No.: 91063
Mount Height: 2.5 m

Illuminance - Cone of Light



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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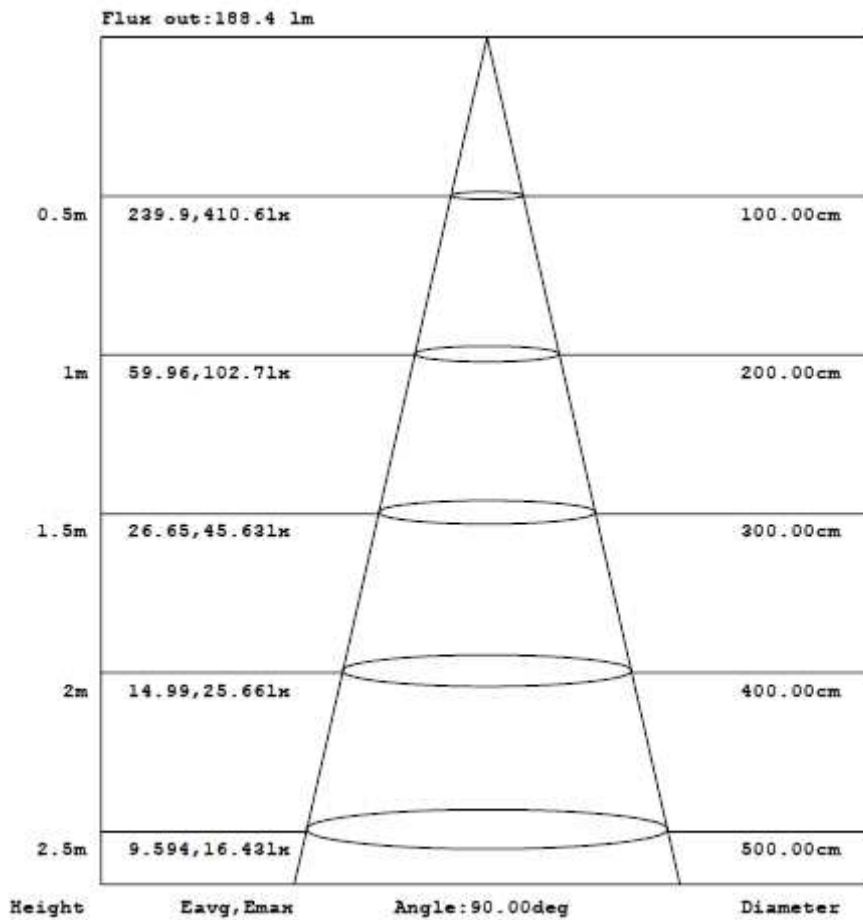
RESULTS OF TESTS (cont'd)

Test Condition: 120V 60Hz for 910XX

Illumination Plots

Model No.: 910XX
Mount Height: 2.5 m

Illuminance - Cone of Light



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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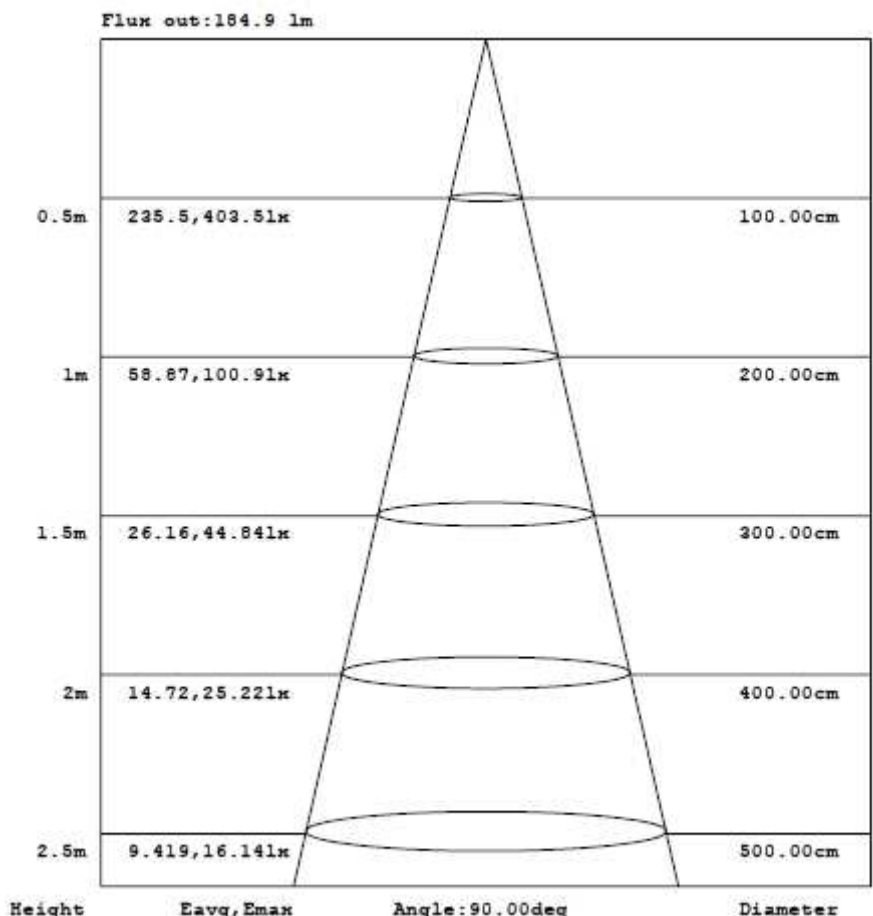
RESULTS OF TESTS (cont'd)

Test Condition: 120V 60Hz for 910XX

Illumination Plots

Model No.: 910XX
Mount Height: 2.5 m

Illuminance - Cone of Light



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

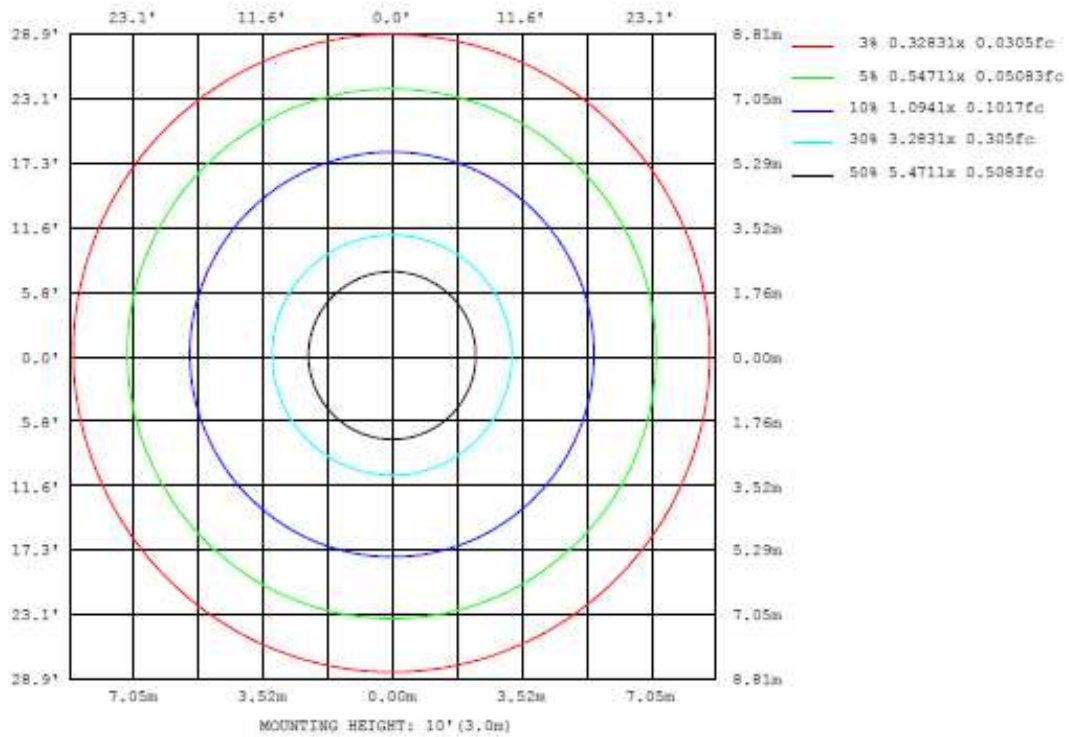
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RESULTS OF TESTS (cont'd)

Test Condition: 120V 60Hz for 910XX

Model No.: 910XX
Mount Height: 3 m
Isoillumination Plot



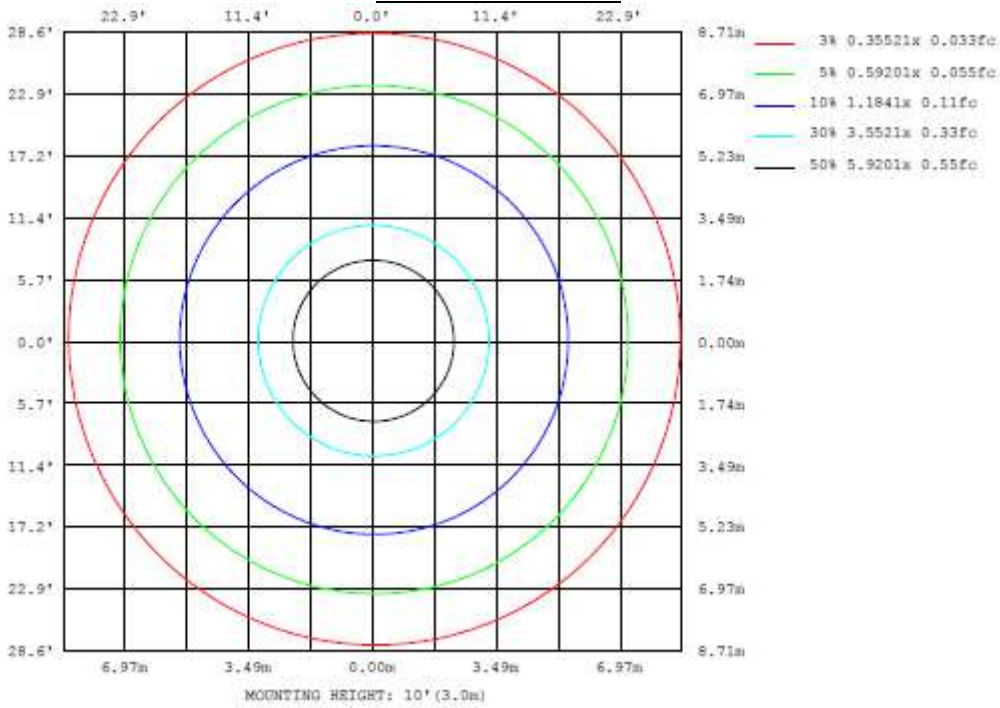
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RESULTS OF TESTS (cont'd)

Test Condition: 120V 60Hz for 91063

Model No.: 91063
Mount Height: 3 m
Isoillumination Plot



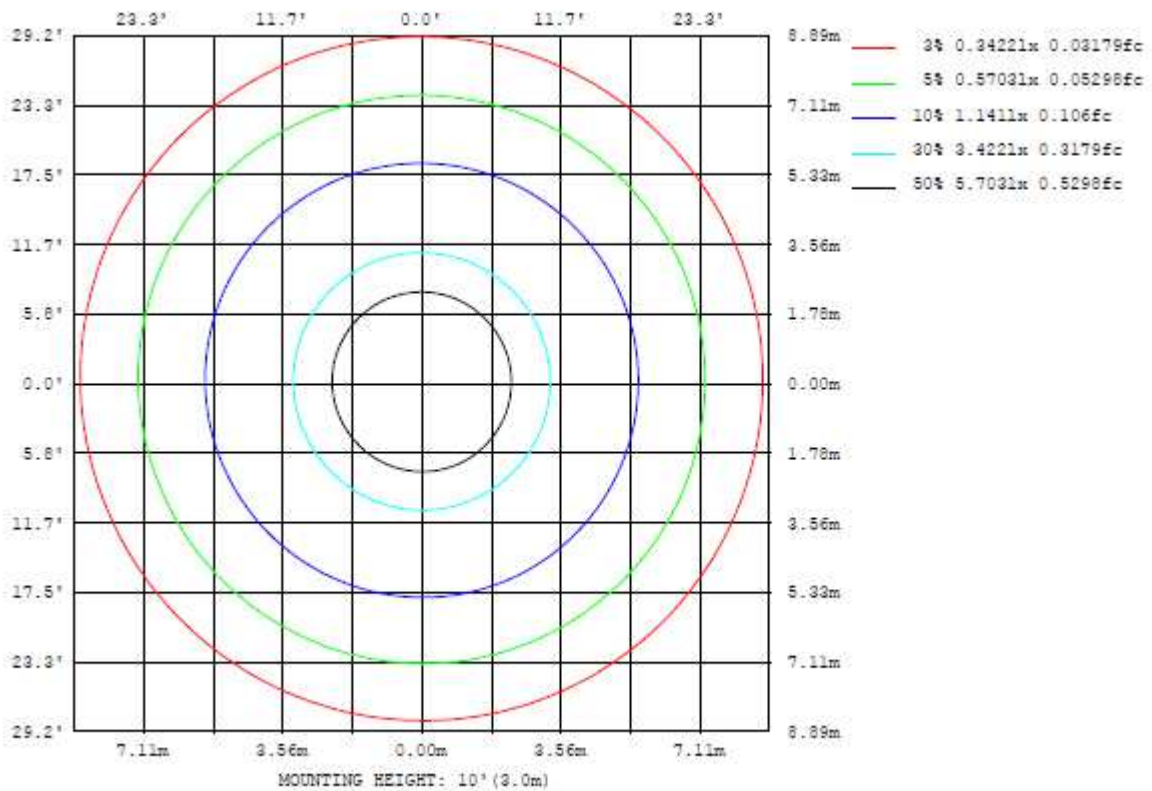
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RESULTS OF TESTS (cont'd)

Test Condition: 120V 60Hz for 910XX

Model No.: 910XX
Mount Height: 3 m
Isoillumination Plot



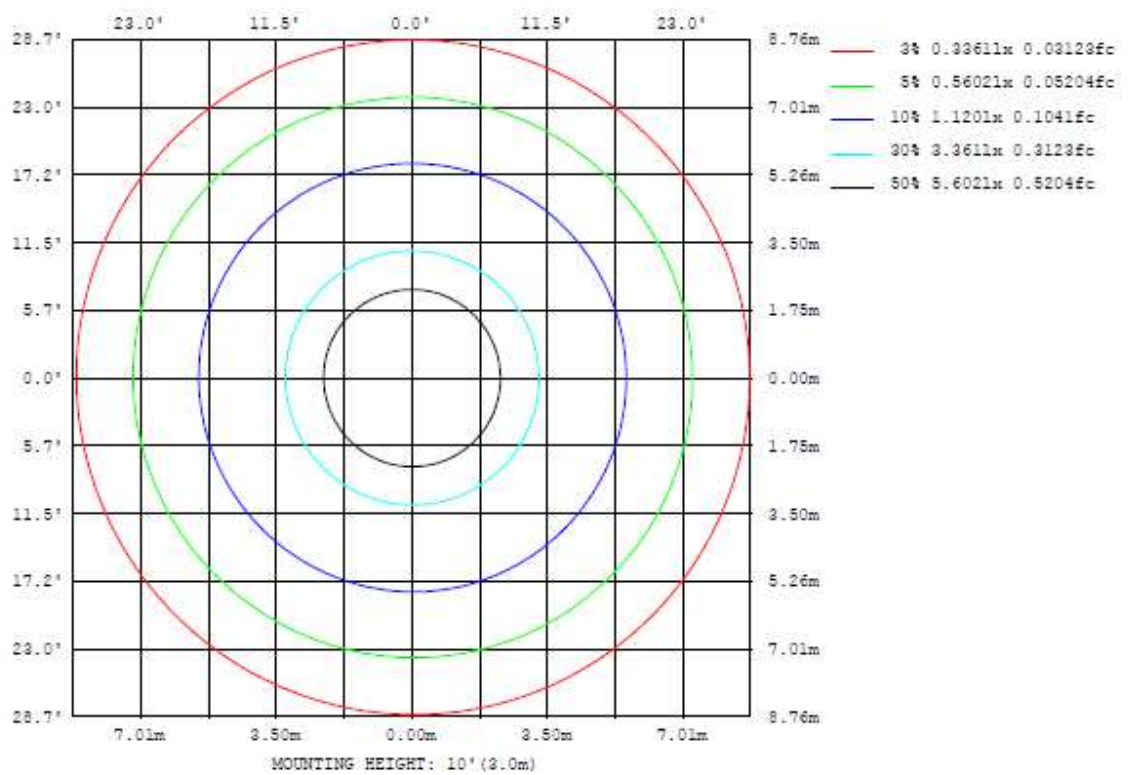
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RESULTS OF TESTS (cont'd)

Test Condition: 120V 60Hz for 910XX

Model No.: 910XX
Mount Height: 3 m
Isoillumination Plot



***** End of Page *****



RESULTS OF TESTS (cont'd)

Product Picture (not to scale)



External view

In Charge Of Tests:

Jordan Rao
Project Engineer

Report Reviewed By:

Jimmy Wang
Reviewer

Attachment: None

***** End of Report *****