



8165 E Kaiser Blvd. Anaheim, CA 92808  
www.lightlaboratory.com

Report No: L021702101



**Report No:** L021702101

**Issue Date:** 2/14/2017

**Report Prepared For:** Revolution Lighting Technologies  
4139 Guardian St. Simi Valley, CA 93063

**Model Number:** 202400-111

**Test:** Electrical and Photometric tests

**Standards Used:** Appropriate part or all test guidelines were used for test performed:  
*IESNA LM79: 2008* Approved Methods for Electrical and Photometric Measurements of Solid-State Lighting Products  
*ANSI NEMA ANSLG C78.377: 2008* Specification of the Chromaticity of Solid State Lighting Products  
*ANSI C82.77:2002:* Harmonic Emission Limits-Related Quality Requirements for Lighting Equipment

**Description of Sample:** Client submitted the sample. Received in working and undamaged condition. No modifications were necessary.

**Testing Condition:** Fixture is tested with no special conditions.

**Sample Arrival Date:** 2/8/17

**Date of Tests:** 2/9/17 - 2/14/17

**Seasoning of Sample:** No seasoning was performed in accordance with IESNA LM-79.

**Equipment List**

Equipment Used	Model No	Stock No	Calibration Due Date
Chroma Programmable AC Source	61604	PS-AC02	--
Yokogawa Digital Power Meter	WT210	MT-EL06-S1	11/28/17
ITECH	IT6122	PS-DC03-S1	11/28/17
Fluke Digital Thermometer	52k/J	MT-TP02-GC	11/28/17
LLI Type C Goniophotometer System	RMG-C-MKII	CD-LL04-GC	--
LLI 2M Sphere	2MR97	CD-SN03-S2	--
LLI Spectroradiometer	SPR-3000	MT-SC01-S2	Before Use

\*All Results in accordance to IESNA LM-79-2008: Approved Method for the Electrical and Photometric Testing of Solid-State Lighting.

**Test Summary**

<b>Manufacturer:</b>	Revolution Lighting Technologies
<b>Model Number:</b>	202400-111
<b>Driver Model Number:</b>	N/A
<b>Total Lumens:</b>	1067.92
<b>Input Voltage (VAC/60Hz):</b>	120.00
<b>Input Current (Amp):</b>	0.07
<b>Input Power (W):</b>	8.21
<b>Input Power Factor:</b>	0.99
<b>Current ATHD @ 120V(%):</b>	6%
<b>Current ATHD @ 277V(%):</b>	N/A
<b>Efficacy:</b>	130
<b>Color Rendering Index (CRI):</b>	82
<b>Correlated Color Temperature (K):</b>	3034
<b>Chromaticity Coordinate x:</b>	0.4348
<b>Chromaticity Coordinate y:</b>	0.4039
<b>Ambient Temperature (°C):</b>	25.0
<b>Stabilization Time (Hours):</b>	0:55
<b>Total Operating Time (Hours):</b>	1:25

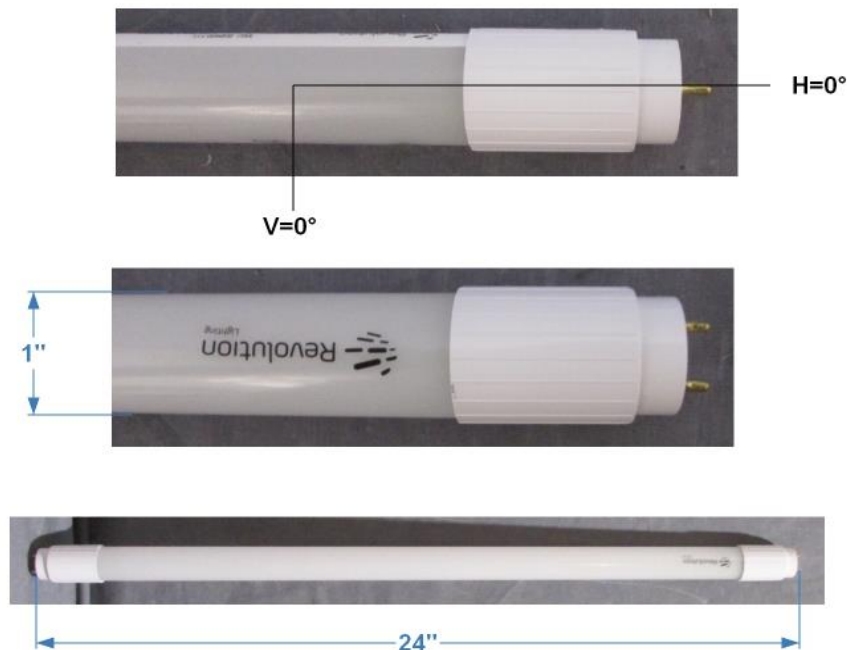
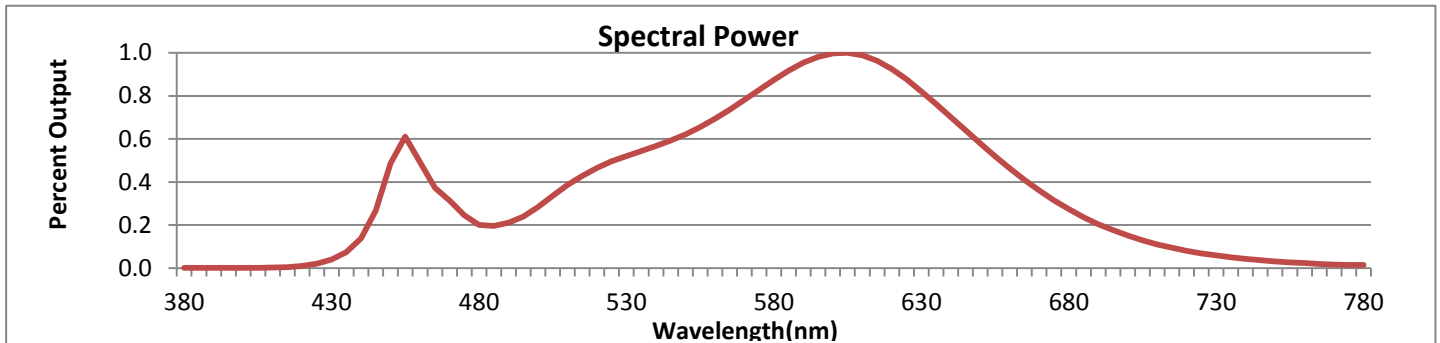


FIG. 1 LUMINAIRE

\*All Results in accordance to IESNA LM-79-2008: Approved Method for the Electrical and Photometric Testing of Solid-State Lighting.



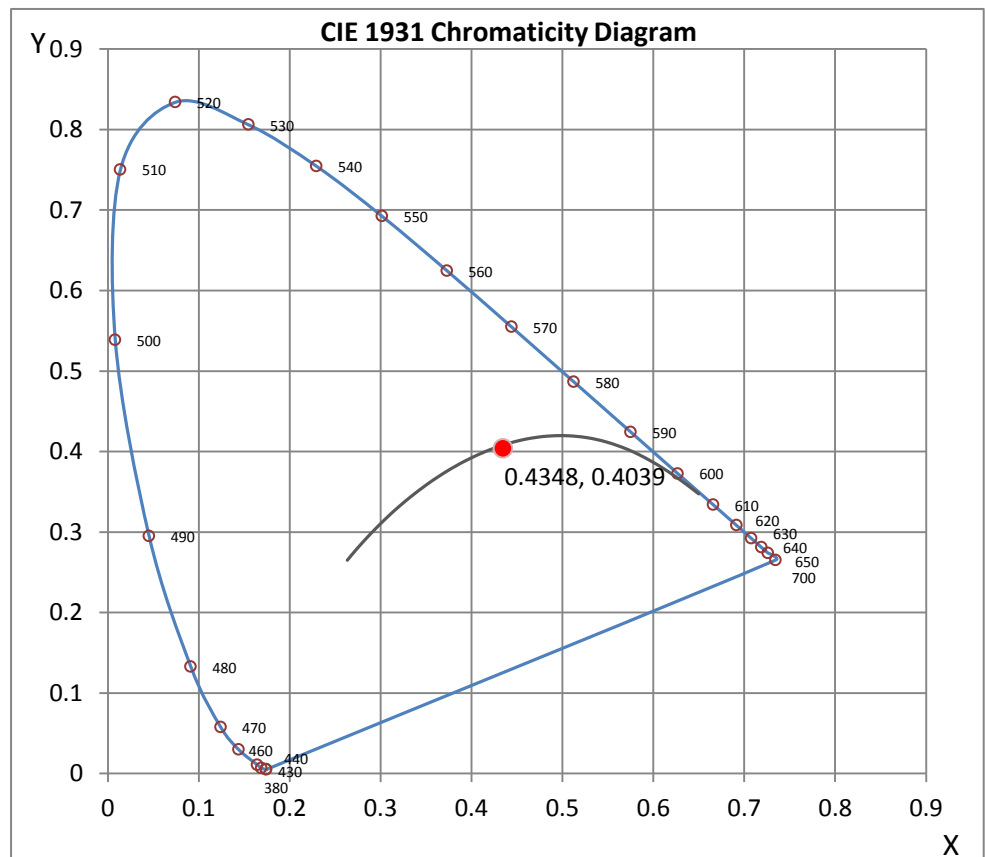
Wavelength	W/m <sup>2</sup> nm	440	0.1375	510	0.3855	580	0.8741	650	0.5799	720	0.0805
380	0.0006	450	0.4857	520	0.4650	590	0.9537	660	0.4639	730	0.0586
390	0.0008	460	0.4910	530	0.5205	600	0.9979	670	0.3602	740	0.0426
400	0.0009	470	0.3135	540	0.5677	610	0.9886	680	0.2741	750	0.0310
410	0.0023	480	0.2007	550	0.6219	620	0.9251	690	0.2040	760	0.0227
420	0.0102	490	0.2101	560	0.6934	630	0.8206	700	0.1507	770	0.0167
430	0.0397	500	0.2843	570	0.7811	640	0.7013	710	0.1103	780	0.0145

**CRI & CCT**

x	0.4348
y	0.4039
u'	0.2493
v'	0.5210
CRI	82.10
CCT	3034
Duv	0.00022

**R Values**

R1	80.77
R2	91.04
R3	96.35
R4	79.11
R5	80.12
R6	88.34
R7	82.58
R8	58.70
R9	6.65
R10	78.63
R11	77.58
R12	65.28
R13	83.32
R14	98.65



\*All Results in accordance to IESNA LM-79-2008: Approved Method for the Electrical and Photometric Testing of Solid-State Lighting.

## Test Methods

### Photometric Measurements - Goniophotometer

A Custom Light Laboratory Type C Rotating Mirror Goniophotometer was used to measure candelas(intensity) at each angle of distribution as defined by IESNA for the appropriate fixture type.

Ambient temperature is set to 25°C and is measured from the center of the fixture, within 1ft from the outside of the fixture. Temperature is maintained at 25°C throughout the testing process and the sample is stabilized for at least 30mins and longer as necessary for the sample to achieve stabilization.

Electrical measurements are measured using the listed equipment.

### Spectral Measurements - Integrating Sphere

A Sensing Spectroradiometer SPR-3000, in conjunction with Light Laboratory 2 meter integrating sphere was used to measure chromaticity coordinates, correlated color temperature(CCT) and the color rendering index(CRI) for each sample.

Ambient temperature is set to 25°C and is measured from the center of the fixture, within 1ft from the outside of the fixture. Temperature is maintained at 25°C throughout the testing process and the sample is stabilized for at least 30mins and longer as necessary for the sample to achieve stabilization.

Electrical measurements are measured using the listed equipment.

### Disclaimers:

This report must not be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST or any agency of Federal Government.

Report Prepared by : Keyur Patel

Test Report Released by:



Jeff Ahn  
Engineering Manager

Test Report Reviewed by:



Steve Kang  
Quality Assurance

*\*Attached are photometric data reports. Total number of pages: 9*



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# Photometric Test Report

**IES INDOOR REPORT**  
**PHOTOMETRIC FILENAME : L021702101.IES**

## DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002  
[TEST] L021702101  
[TESTLAB] LIGHT LABORATORY, INC.  
[ISSUEDATE] 2/14/2017  
[MANUFAC] REVOLUTION LIGHTING TECHNOLOGIES  
[LUMCAT] 202400-111  
[LUMINAIRE] 2FT LED TUBE  
[BALLASTCAT] N/A  
[LAMPPOSITION] 0,0  
[LAMPCAT] N/A  
[OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND  
[MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.  
[INPUT] 120VAC, 8.21W  
[TEST PROCEDURE] IESNA:LM-79-08

## CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	1068
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	130
Total Luminaire Watts	8.21
Ballast Factor	1.00
CIE Type	Semi-Direct
Spacing Criterion (0-180)	1.22
Spacing Criterion (90-270)	1.44
Spacing Criterion (Diagonal)	1.48
Basic Luminous Shape	Rectangular w/Sides
Luminous Length (0-180)	1.63 ft
Luminous Width (90-270)	0.08 ft
Luminous Height	0.06 ft

## LUMINANCE DATA (cd/sq.m)

Angle In Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	14628	11960	12341
55	13407	11246	12013
65	11759	10739	11852
75	9071	10527	11965
85	4316	10816	12353

**IES INDOOR REPORT  
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**CANDELA TABULATION**

	<u>0.0</u>	<u>22.5</u>	<u>45.0</u>	<u>67.5</u>	<u>90.0</u>
<b>0</b>	209.13	209.13	209.13	209.13	209.13
<b>5</b>	207.43	208.17	208.38	208.80	208.92
<b>10</b>	204.52	205.52	206.14	207.22	207.43
<b>15</b>	199.04	200.41	202.82	205.18	206.35
<b>20</b>	191.48	193.19	198.04	202.32	204.27
<b>25</b>	181.93	184.92	192.19	199.21	201.61
<b>30</b>	170.89	175.17	184.96	194.68	198.21
<b>35</b>	158.52	164.41	176.99	189.70	194.06
<b>40</b>	144.48	152.04	168.61	184.05	189.82
<b>45</b>	130.04	139.59	159.60	177.78	185.17
<b>50</b>	114.51	125.97	149.88	171.26	179.61
<b>55</b>	98.15	112.35	140.37	163.96	173.05
<b>60</b>	81.63	98.90	130.74	156.28	165.74
<b>65</b>	65.02	85.53	120.69	148.18	158.43
<b>70</b>	48.49	72.78	110.81	139.88	150.80
<b>75</b>	32.38	61.07	101.64	131.36	142.66
<b>80</b>	17.77	50.74	92.67	122.52	133.86
<b>85</b>	6.48	41.85	84.12	113.80	124.97
<b>90</b>	1.08	35.17	76.39	105.66	116.33
<b>95</b>	0.25	29.98	69.29	97.44	107.95
<b>100</b>	0.00	26.36	62.65	89.31	99.40
<b>105</b>	0.00	23.83	56.76	81.42	90.76
<b>110</b>	0.00	22.05	51.48	74.36	82.62
<b>115</b>	0.00	20.59	46.83	67.34	75.07
<b>120</b>	0.00	19.43	42.43	60.82	68.01
<b>125</b>	0.00	18.23	38.49	54.60	60.45
<b>130</b>	0.00	16.73	34.83	48.78	54.06
<b>135</b>	0.00	15.61	31.43	43.35	48.00
<b>140</b>	0.00	14.37	28.03	38.36	42.02
<b>145</b>	0.00	12.37	24.25	33.30	36.29
<b>150</b>	0.00	10.30	20.47	28.19	31.14
<b>155</b>	0.00	8.89	16.52	23.21	25.99
<b>160</b>	0.00	8.06	12.08	18.64	20.59
<b>165</b>	0.00	6.68	9.96	12.58	15.53
<b>170</b>	0.00	5.44	7.85	8.97	10.88
<b>175</b>	0.00	4.28	5.69	5.56	5.90
<b>180</b>	0.00	0.00	0.00	0.00	0.00

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**ZONAL LUMEN SUMMARY**

Zone	Lumens	%Lamp	%Fixt
0-20	77.10	N.A.	7.20
0-30	165.68	N.A.	15.50
0-40	276.47	N.A.	25.90
0-60	522.70	N.A.	48.90
0-80	739.26	N.A.	69.20
0-90	823.03	N.A.	77.10
10-90	803.21	N.A.	75.20
20-40	199.37	N.A.	18.70
20-50	321.92	N.A.	30.10
40-70	361.82	N.A.	33.90
60-80	216.56	N.A.	20.30
70-80	100.97	N.A.	9.50
80-90	83.77	N.A.	7.80
90-110	123.62	N.A.	11.60
90-120	166.50	N.A.	15.60
90-130	198.35	N.A.	18.60
90-150	234.48	N.A.	22.00
90-180	244.89	N.A.	22.90
110-180	121.26	N.A.	11.40
0-180	1067.92	N.A.	100.00

Total Luminaire Efficiency = N.A.%

**ZONAL LUMEN SUMMARY**

Zone	Lumens
0-10	19.82
10-20	57.28
20-30	88.58
30-40	110.79
40-50	122.55
50-60	123.68
60-70	115.59
70-80	100.97
80-90	83.77
90-100	68.58
100-110	55.04
110-120	42.88
120-130	31.85
130-140	22.22
140-150	13.90
150-160	7.21
160-170	2.73
170-180	0.47

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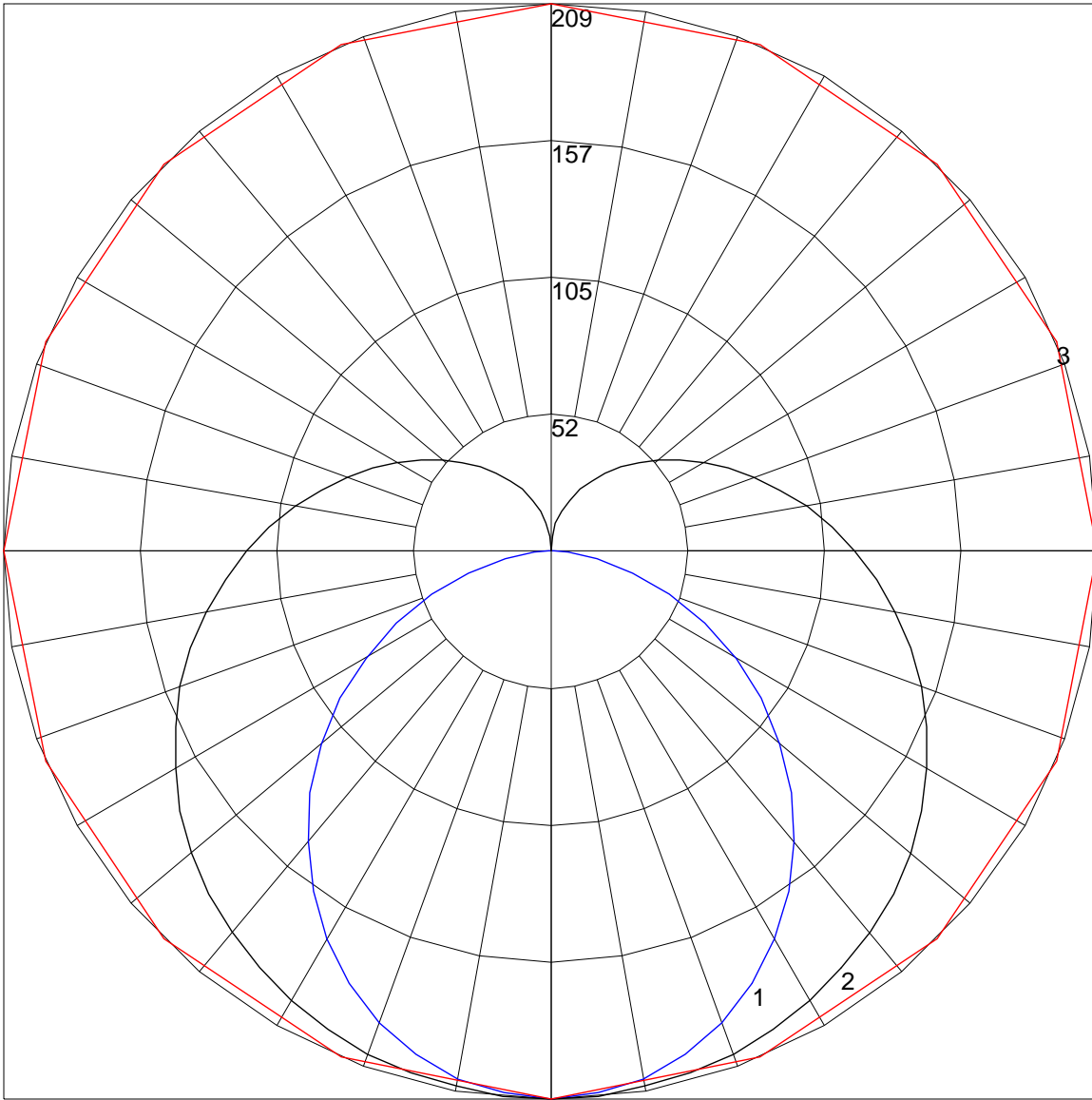
**COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD**

Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0	
	RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	114	114	114	114	114	108	108	108	108	98	98	98	89	89	89	81	81	81	77
1	100	94	89	84	84	95	90	85	80	81	77	74	73	70	67	66	64	61	58
2	90	80	73	66	66	85	77	69	63	69	63	58	62	58	54	56	52	49	46
3	81	70	61	53	53	77	66	58	51	60	53	48	54	49	44	49	44	40	37
4	74	61	52	44	44	70	58	50	43	53	46	40	48	42	37	43	38	34	31
5	68	54	45	38	38	64	52	43	36	47	40	34	43	36	31	38	33	29	26
6	62	48	39	32	32	59	46	38	31	42	35	29	38	32	27	35	29	25	23
7	58	44	35	28	28	54	42	33	27	38	31	26	35	29	24	32	26	22	20
8	54	40	31	25	25	51	38	30	24	35	28	23	32	26	21	29	24	20	18
9	50	36	28	22	22	47	35	27	22	32	25	20	29	23	19	27	21	18	16
10	47	33	25	20	20	44	32	24	19	29	23	18	27	21	17	25	20	16	14



POLAR GRAPH



Maximum Candela = 209.13 Located At Horizontal Angle = 0, Vertical Angle = 0  
# 1 - Vertical Plane Through Horizontal Angles (0 - 180) (Through Max. Cd.)  
# 2 - Vertical Plane Through Horizontal Angles (90 - 270)  
# 3 - Horizontal Cone Through Vertical Angle (0) (Through Max. Cd.)