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Report No: L081600706

Date: 8/5/2016



NVLAP LAB CODE 200927-0

**Report No:** L081600706

**Report Prepared For:** REVOLUTION LIGHTING TECHNOLOGIES  
 4139 Guardian St. Simi Valley, CA 93063 USA

**Model Number:** 512010-015

**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. Catalog number is 512010-015 . Received in working and undamaged condition. No modifications were necessary.

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

**Sample Arrival Date:** 8/1/16

**Date of Tests:** 8/4/16 - 8/5/16

**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	11/18/16
Xitron Power Analyzer	2503AH	MT-EL01	11/30/16
ITECH DC Power Supply	IT6122	PSDC-03-S1	11/17/16
Fluke Digital Thermometer	52k/J	MT-TP02-GC	11/24/16
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 TECHNOLOGI
<b>Model Number:</b>	512010-015
<b>Driver Model Number:</b>	N/A
<b>Total Lumens:</b>	1136.21
<b>Input Voltage (VAC/60Hz):</b>	277.00
<b>Input Current (Amp):</b>	0.04
<b>Input Power (W):</b>	8.93
<b>Input Power Factor:</b>	0.92
<b>Current ATHD @ 120V(%):</b>	N/A
<b>Current ATHD @ 277V(%):</b>	21%
<b>Efficacy:</b>	127
<b>Color Rendering Index (CRI):</b>	84
<b>Correlated Color Temperature (K):</b>	5172
<b>Chromaticity Coordinate x:</b>	0.3406
<b>Chromaticity Coordinate y:</b>	0.3502
<b>Ambient Temperature (°C):</b>	25.0
<b>Stabilization Time (Hours):</b>	0:35
<b>Total Operating Time (Hours):</b>	1:00
<b>Off State Power(W):</b>	0.00

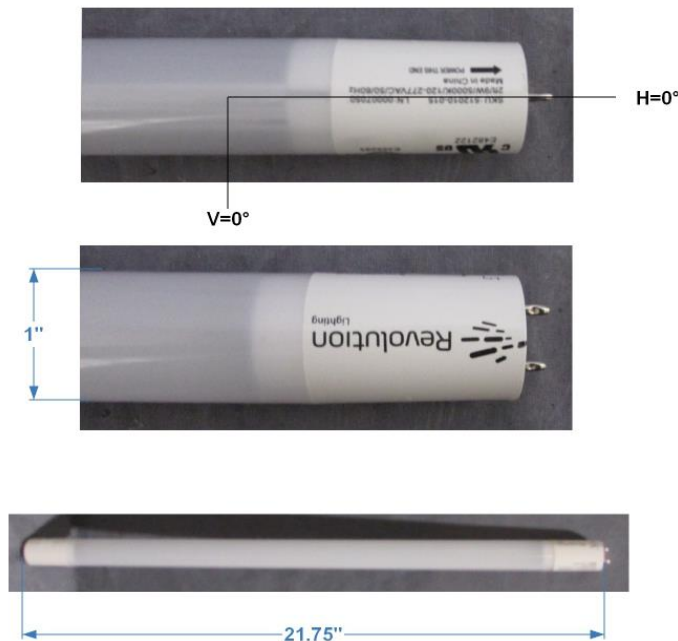
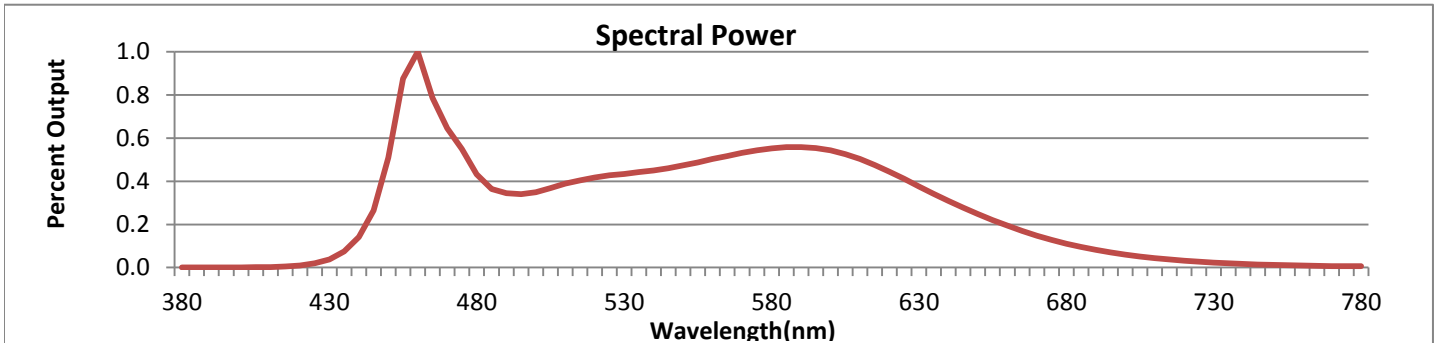


FIG. 1 LUMINAIRE

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



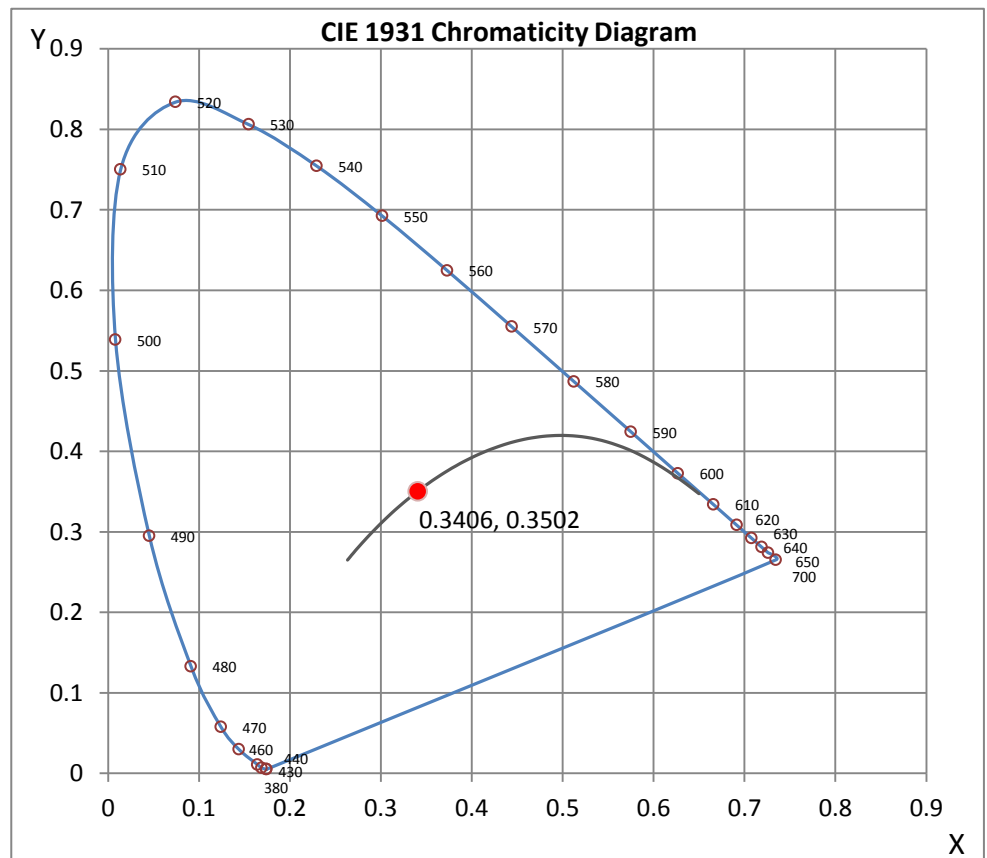
Wavelength	W/m <sup>2</sup> nm	440	0.1408	510	0.3888	580	0.5522	650	0.2488	720	0.0320
380	0.0006	450	0.5090	520	0.4172	590	0.5581	660	0.1944	730	0.0233
390	0.0008	460	1.0000	530	0.4344	600	0.5440	670	0.1473	740	0.0170
400	0.0010	470	0.6456	540	0.4505	610	0.5037	680	0.1108	750	0.0125
410	0.0022	480	0.4326	550	0.4735	620	0.4448	690	0.0821	760	0.0092
420	0.0092	490	0.3448	560	0.5029	630	0.3766	700	0.0601	770	0.0068
430	0.0382	500	0.3491	570	0.5321	640	0.3095	710	0.0438	780	0.0059

**CRI & CCT**

x	0.3406
y	0.3502
u'	0.2089
v'	0.4833
CRI	84.40
CCT	5172
Duv	0.00115

**R Values**

R1	86.51
R2	98.51
R3	89.70
R4	77.43
R5	84.66
R6	92.22
R7	80.58
R8	65.30
R9	17.86
R10	95.03
R11	78.04
R12	65.32
R13	91.55
R14	95.07



\*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 : L081600706.IES**

**DESCRIPTION INFORMATION (From Photometric File)**

IESNA:LM-63-2002  
 [TEST] L081600706  
 [TESTLAB] LIGHT LABORATORY, INC.  
 [ISSUEDATE] 8/5/2016  
 [MANUFAC] REVOLUTION LIGHTING TECHNOLOGIES  
 [LUMCAT] 512010-015  
 [LUMINAIRE] 2 ft signage tube 5000K SEP  
 [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] 277VAC, 8.93W  
 [TEST PROCEDURE] IESNA:LM-79-08

**CHARACTERISTICS**

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	1136
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	127
Total Luminaire Watts	8.93
Ballast Factor	1.00
CIE Type	General Diffuse
Spacing Criterion (0-180)	N.A.
Spacing Criterion (90-270)	N.A.
Spacing Criterion (Diagonal)	N.A.
Basic Luminous Shape	Hor. Cylinder Along Length
Luminous Length (0-180)	1.44 ft
Luminous Width (90-270)	0.08 ft (Diameter)
Luminous Height	0.08 ft (Diameter)

**LUMINANCE DATA (cd/sq.m)**

Angle In Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	303102	14168	11412
55	200947	11817	10221
65	121617	9611	9179
75	57985	7902	8396
85	10459	6985	7958

**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>	158.83	158.83	158.83	158.83	158.83
<b>5</b>	157.91	158.03	158.28	158.54	158.58
<b>10</b>	155.56	155.81	156.52	156.98	157.07
<b>15</b>	151.19	152.16	153.33	154.13	154.47
<b>20</b>	145.91	146.87	148.63	150.06	150.77
<b>25</b>	138.78	140.24	142.68	145.07	145.99
<b>30</b>	130.64	132.32	135.76	139.36	140.79
<b>35</b>	121.32	123.51	128.12	132.99	134.92
<b>40</b>	111.09	113.82	119.48	125.94	128.71
<b>45</b>	100.18	103.33	110.63	118.64	122.25
<b>50</b>	88.69	92.42	101.82	111.55	115.79
<b>55</b>	76.94	81.22	92.71	104.63	109.49
<b>60</b>	64.35	69.81	83.57	97.92	103.62
<b>65</b>	51.52	58.65	75.68	91.96	98.33
<b>70</b>	38.68	47.91	68.72	86.71	93.72
<b>75</b>	26.18	38.09	62.38	82.52	89.94
<b>80</b>	14.43	30.29	57.89	79.37	87.01
<b>85</b>	4.87	25.05	55.21	77.40	85.25
<b>90</b>	0.42	23.16	54.37	76.60	84.57
<b>95</b>	4.87	25.05	55.21	77.40	85.25
<b>100</b>	14.43	30.29	57.89	79.37	87.01
<b>105</b>	26.18	38.09	62.38	82.52	89.94
<b>110</b>	38.68	47.91	68.72	86.71	93.72
<b>115</b>	51.52	58.65	75.68	91.96	98.33
<b>120</b>	64.35	69.81	83.57	97.92	103.62
<b>125</b>	76.94	81.22	92.71	104.63	109.49
<b>130</b>	88.69	92.42	101.82	111.55	115.79
<b>135</b>	100.18	103.33	110.63	118.64	122.25
<b>140</b>	111.09	113.82	119.48	125.94	128.71
<b>145</b>	121.32	123.51	128.12	132.99	134.92
<b>150</b>	130.64	132.32	135.76	139.36	140.79
<b>155</b>	138.78	140.24	142.68	145.07	145.99
<b>160</b>	145.91	146.87	148.63	150.06	150.77
<b>165</b>	151.19	152.16	153.33	154.13	154.47
<b>170</b>	155.56	155.81	156.52	156.98	157.07
<b>175</b>	157.91	158.03	158.28	158.54	158.58
<b>180</b>	158.83	158.83	158.83	158.83	158.83

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**ZONAL LUMEN SUMMARY**

Zone	Lumens	%Lamp	%Fixt
0-20	58.26	N.A.	5.10
0-30	124.02	N.A.	10.90
0-40	204.26	N.A.	18.00
0-60	373.27	N.A.	32.90
0-80	512.17	N.A.	45.10
0-90	568.11	N.A.	50.00
10-90	553.06	N.A.	48.70
20-40	146.00	N.A.	12.80
20-50	231.76	N.A.	20.40
40-70	243.82	N.A.	21.50
60-80	138.90	N.A.	12.20
70-80	64.09	N.A.	5.60
80-90	55.93	N.A.	4.90
90-110	120.02	N.A.	10.60
90-120	194.84	N.A.	17.10
90-130	278.09	N.A.	24.50
90-150	444.08	N.A.	39.10
90-180	568.11	N.A.	50.00
110-180	448.08	N.A.	39.40
0-180	1136.21	N.A.	100.00

Total Luminaire Efficiency = N.A.%

**ZONAL LUMEN SUMMARY**

Zone	Lumens
0-10	15.05
10-20	43.22
20-30	65.76
30-40	80.24
40-50	85.76
50-60	83.25
60-70	74.81
70-80	64.09
80-90	55.93
90-100	55.93
100-110	64.09
110-120	74.81
120-130	83.25
130-140	85.76
140-150	80.24
150-160	65.76
160-170	43.22
170-180	15.05

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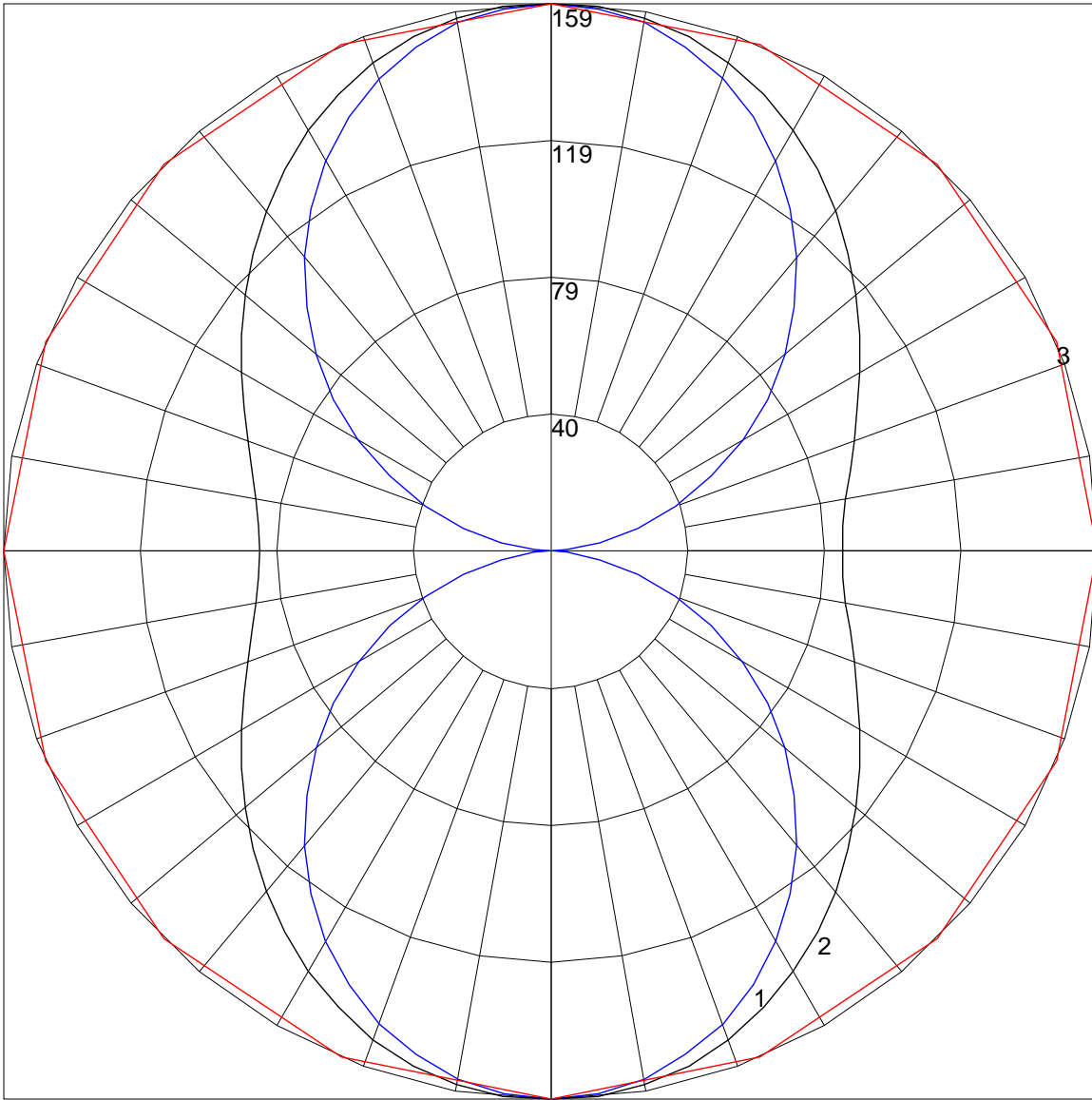
**COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD**

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	107	107	107	107	99	99	99	99	83	83	83	69	69	69	56	56	56	50
1	96	90	86	82	88	83	79	76	70	67	64	58	55	53	46	45	43	38
2	86	78	71	65	79	72	66	61	60	56	52	50	46	43	40	37	35	30
3	78	68	60	53	72	63	56	50	53	47	43	43	39	36	35	32	29	25
4	72	60	51	45	65	55	48	42	46	41	36	38	34	30	31	27	25	21
5	65	53	44	38	60	49	41	36	41	35	31	34	30	26	27	24	21	18
6	60	47	39	33	55	44	36	31	37	31	27	31	26	22	25	21	18	15
7	56	43	34	29	51	40	32	27	34	28	23	28	23	20	23	19	16	14
8	52	39	31	25	47	36	29	24	31	25	20	25	21	17	21	17	15	12
9	48	35	28	22	44	33	26	21	28	22	18	23	19	16	19	16	13	11
10	45	32	25	20	41	30	23	19	26	20	16	22	17	14	18	14	12	10



POLAR GRAPH



Maximum Candela = 158.83 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.)