



8165 E Kaiser Blvd. Anaheim, CA 92808
 p. 714.282.2270
 f. 714.676.5558

Report No: L081600705

Date: 8/5/2016



NVLAP LAB CODE 200927-0

Report No: L081600705

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

Model Number: 513011-015

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 513011-015 . 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: 8/3/16 - 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

Manufacturer:	REVOLUTION LIGHTING TECHNOLOGI
Model Number:	513011-015
Driver Model Number:	N/A
Total Lumens:	1633.45
Input Voltage (VAC/60Hz):	277.00
Input Current (Amp):	0.05
Input Power (W):	12.01
Input Power Factor:	0.94
Current ATHD @ 120V(%):	N/A
Current ATHD @ 277V(%):	18%
Efficacy:	136
Color Rendering Index (CRI):	84
Correlated Color Temperature (K):	5158
Chromaticity Coordinate x:	0.3412
Chromaticity Coordinate y:	0.3535
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:40
Total Operating Time (Hours):	1:10
Off State Power(W):	0.00

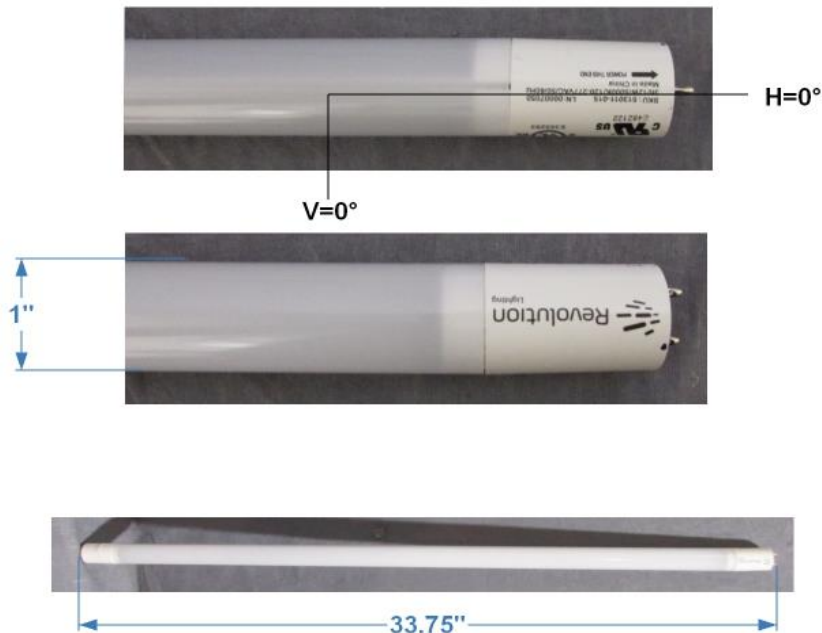
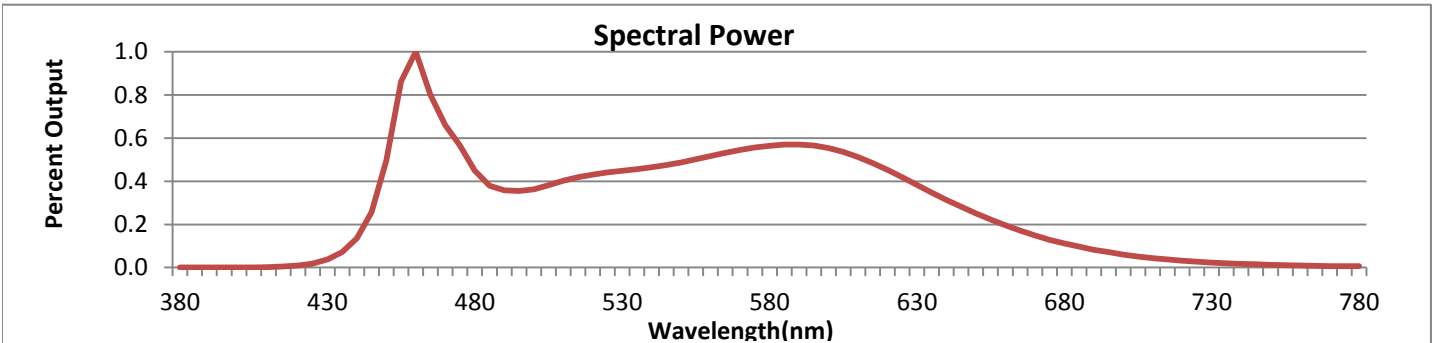


FIG. 1 LUMINAIRE

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



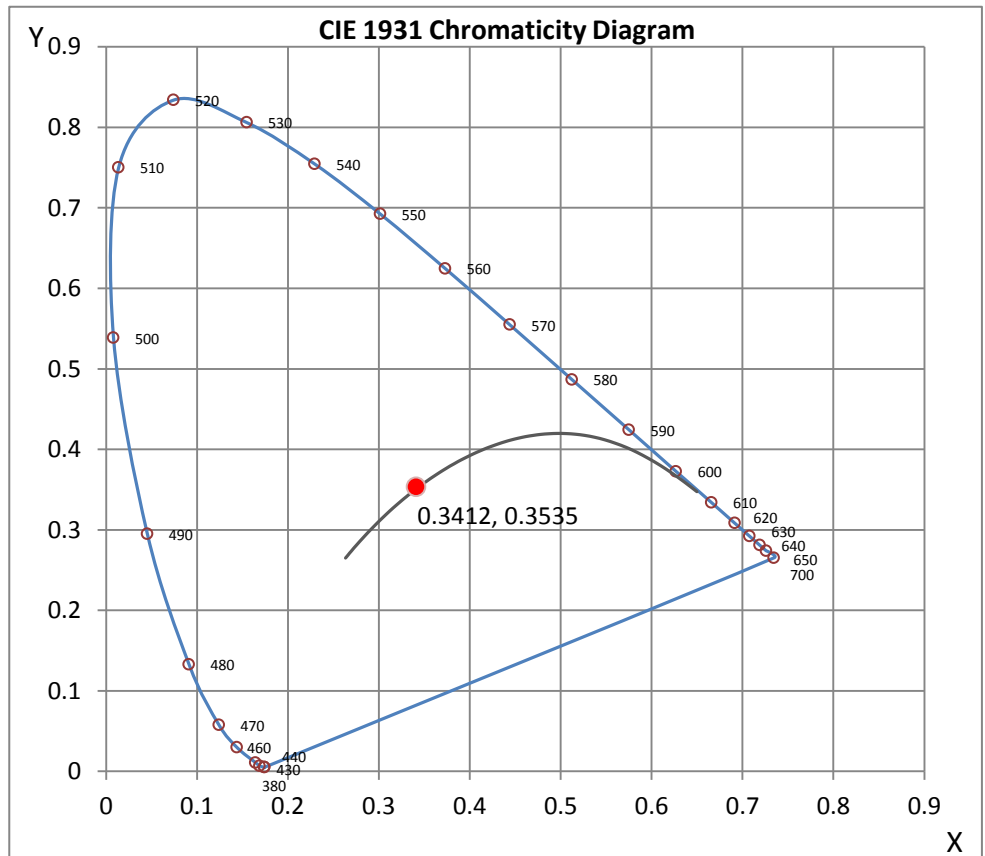
Wavelength	W/m ² nm	440	0.1362	510	0.4026	580	0.5648	650	0.2517	720	0.0322
380	0.0006	450	0.4968	520	0.4316	590	0.5708	660	0.1966	730	0.0234
390	0.0008	460	1.0000	530	0.4492	600	0.5542	670	0.1486	740	0.0170
400	0.0009	470	0.6605	540	0.4654	610	0.5128	680	0.1116	750	0.0126
410	0.0022	480	0.4496	550	0.4876	620	0.4530	690	0.0827	760	0.0092
420	0.0090	490	0.3586	560	0.5174	630	0.3832	700	0.0604	770	0.0069
430	0.0372	500	0.3633	570	0.5457	640	0.3140	710	0.0441	780	0.0059

CRI & CCT

x	0.3412
y	0.3535
u'	0.2081
v'	0.4850
CRI	84.00
CCT	5158
Duv	0.00255

R Values

R1	85.80
R2	98.37
R3	89.57
R4	76.66
R5	84.04
R6	92.61
R7	80.35
R8	64.38
R9	15.04
R10	94.37
R11	77.30
R12	65.08
R13	90.84
R14	94.86



*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 : L081600705.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
 [TEST] L081600705
 [TESTLAB] LIGHT LABORATORY, INC.
 [ISSUEDATE] 8/5/2016
 [MANUFAC] REVOLUTION LIGHTING TECHNOLOGIES
 [LUMCAT] 513011-015
 [LUMINAIRE] 3 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, 12.01W
 [TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	1633
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	136
Total Luminaire Watts	12.01
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)	2.44 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	441190	12208	9661
55	292984	10189	8648
65	178459	8314	7761
75	84187	6825	7063
85	15140	5959	6652

**IES INDOOR REPORT
PHOTOMETRIC FILENAME : L081600705.IES**

CANDELA TABULATION

	<u>0.0</u>	<u>22.5</u>	<u>45.0</u>	<u>67.5</u>	<u>90.0</u>
0	227.76	227.76	227.76	227.76	227.76
5	226.62	226.54	226.92	227.38	227.55
10	223.35	223.48	224.48	225.20	225.70
15	217.56	218.23	219.87	221.21	221.92
20	209.76	211.14	213.28	215.30	216.22
25	199.94	201.87	205.14	208.21	209.59
30	188.45	190.88	195.08	199.61	202.12
35	175.86	178.63	184.17	190.75	193.82
40	161.18	164.79	172.21	180.69	184.42
45	145.82	149.81	159.54	170.37	175.36
50	129.63	134.25	146.45	160.09	166.13
55	112.18	118.09	133.53	150.06	156.98
60	93.64	101.69	120.90	140.24	148.43
65	75.60	85.33	109.20	131.77	140.87
70	57.39	69.68	98.63	124.39	134.25
75	38.01	55.29	89.78	117.55	128.20
80	20.81	43.92	82.90	112.85	123.84
85	7.05	35.95	78.45	109.54	120.74
90	0.50	32.72	76.44	107.90	119.06
95	7.05	35.95	78.45	109.54	120.74
100	20.81	43.92	82.90	112.85	123.84
105	38.01	55.29	89.78	117.55	128.20
110	57.39	69.68	98.63	124.39	134.25
115	75.60	85.33	109.20	131.77	140.87
120	93.64	101.69	120.90	140.24	148.43
125	112.18	118.09	133.53	150.06	156.98
130	129.63	134.25	146.45	160.09	166.13
135	145.82	149.81	159.54	170.37	175.36
140	161.18	164.79	172.21	180.69	184.42
145	175.86	178.63	184.17	190.75	193.82
150	188.45	190.88	195.08	199.61	202.12
155	199.94	201.87	205.14	208.21	209.59
160	209.76	211.14	213.28	215.30	216.22
165	217.56	218.23	219.87	221.21	221.92
170	223.35	223.48	224.48	225.20	225.70
175	226.62	226.54	226.92	227.38	227.55
180	227.76	227.76	227.76	227.76	227.76

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L081600705.IES

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	83.61	N.A.	5.10
0-30	178.12	N.A.	10.90
0-40	293.65	N.A.	18.00
0-60	537.43	N.A.	32.90
0-80	737.33	N.A.	45.10
0-90	816.73	N.A.	50.00
10-90	795.14	N.A.	48.70
20-40	210.03	N.A.	12.90
20-50	333.72	N.A.	20.40
40-70	351.70	N.A.	21.50
60-80	199.89	N.A.	12.20
70-80	91.98	N.A.	5.60
80-90	79.40	N.A.	4.90
90-110	171.38	N.A.	10.50
90-120	279.29	N.A.	17.10
90-130	399.39	N.A.	24.50
90-150	638.61	N.A.	39.10
90-180	816.73	N.A.	50.00
110-180	645.35	N.A.	39.50
0-180	1633.45	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	21.58
10-20	62.03
20-30	94.51
30-40	115.53
40-50	123.69
50-60	120.10
60-70	107.92
70-80	91.98
80-90	79.40
90-100	79.40
100-110	91.98
110-120	107.92
120-130	120.10
130-140	123.69
140-150	115.53
150-160	94.51
160-170	62.03
170-180	21.58

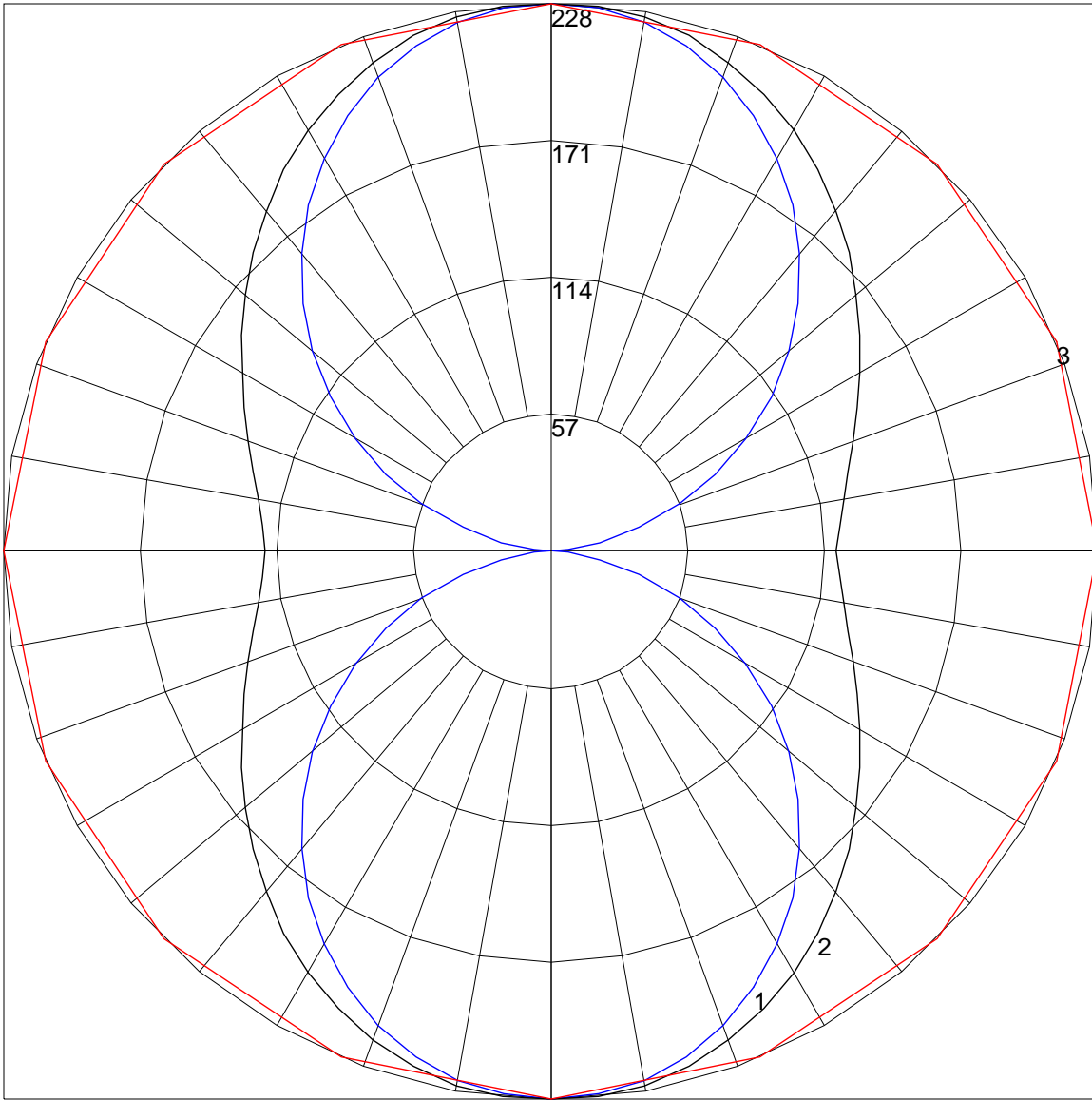
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COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	91	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	21	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 = 227.76 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.)