

Report No: L021702105**Issue Date:** 2/14/2017**Report Prepared For:** Revolution Lighting Technologies
4139 Guardian St. Simi Valley, CA 93063**Model Number:** 204401-113**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

Test Summary

Manufacturer:	Revolution Lighting Technologies
Model Number:	204401-113
Driver Model Number:	N/A
Total Lumens:	1559.83
Input Voltage (VAC/60Hz):	120.00
Input Current (Amp):	0.10
Input Power (W):	11.34
Input Power Factor:	0.99
Current ATHD @ 120V(%):	6%
Current ATHD @ 277V(%):	N/A
Efficacy:	138
Color Rendering Index (CRI):	83
Correlated Color Temperature (K):	3941
Chromaticity Coordinate x:	0.3833
Chromaticity Coordinate y:	0.3792
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:30
Total Operating Time (Hours):	1:00

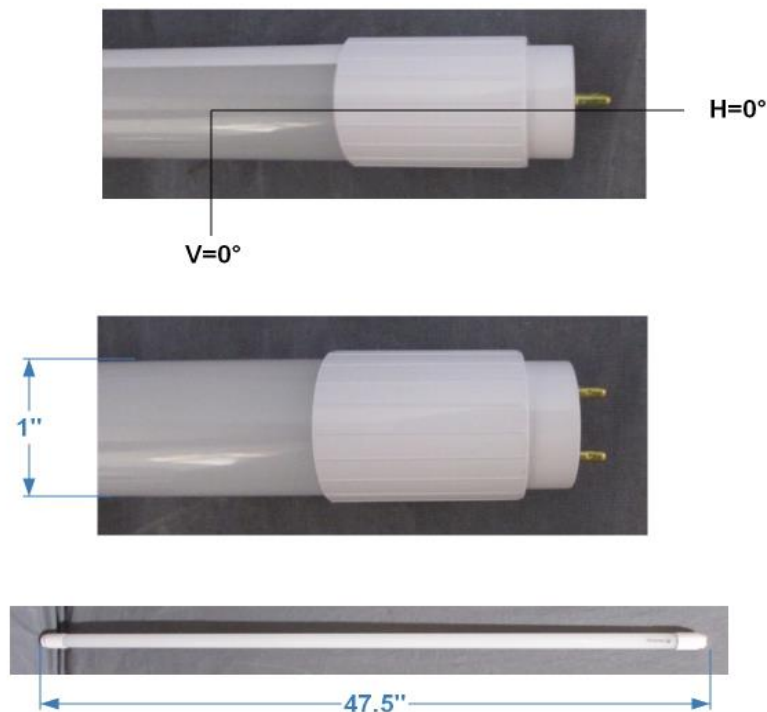
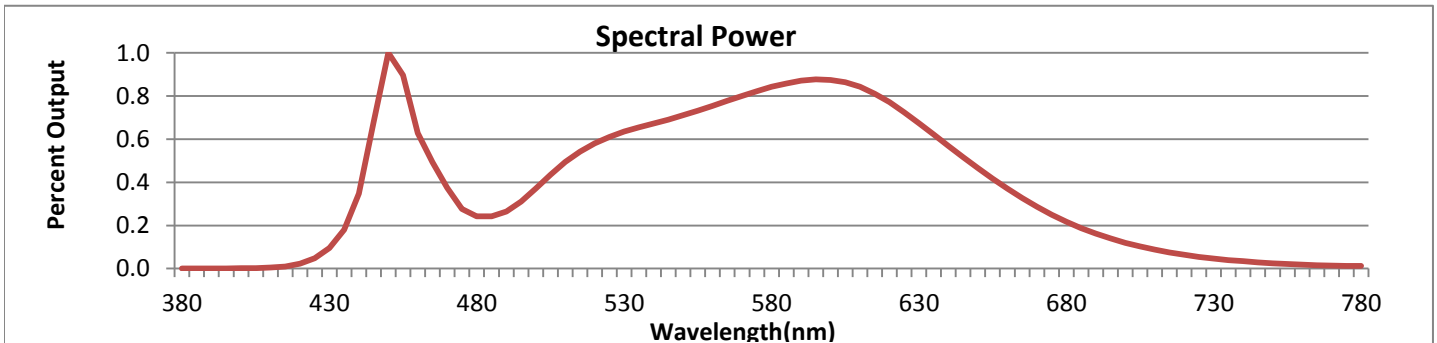


FIG. 1 LUMINAIRE

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



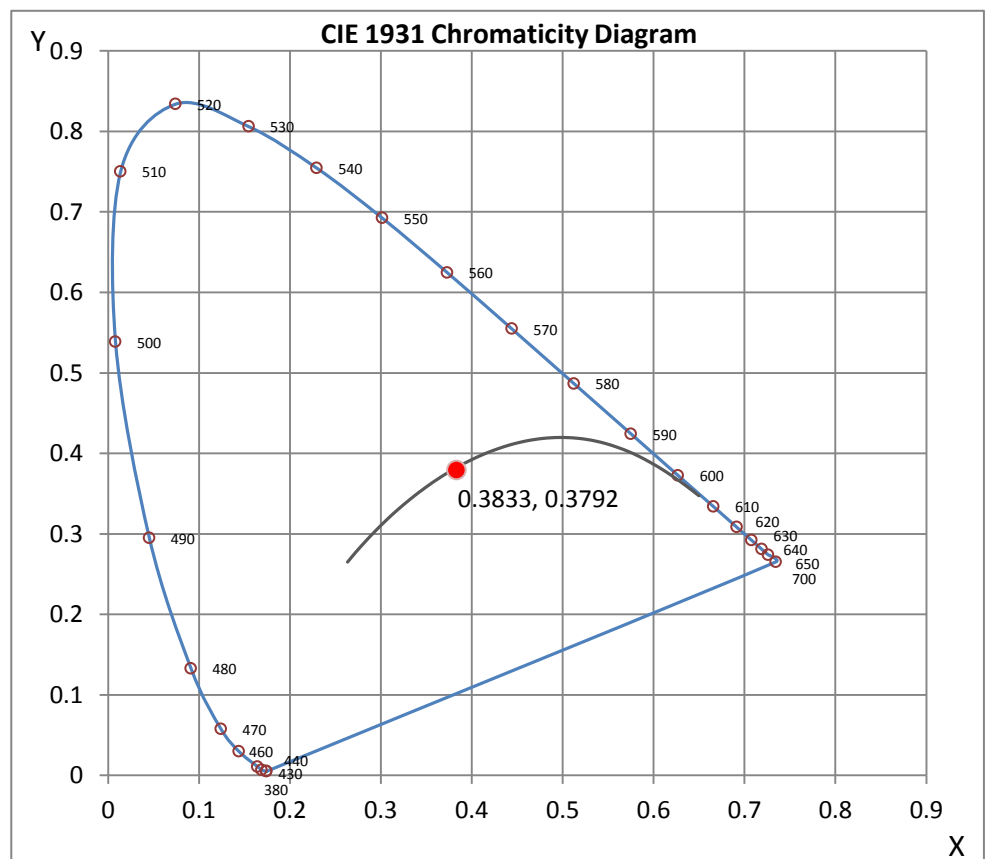
Wavelength	W/m ² nm	440	0.3472	510	0.4939	580	0.8430	650	0.4664	720	0.0640
380	0.0009	450	1.0000	520	0.5811	590	0.8718	660	0.3714	730	0.0465
390	0.0010	460	0.6289	530	0.6351	600	0.8751	670	0.2869	740	0.0341
400	0.0016	470	0.3741	540	0.6733	610	0.8434	680	0.2169	750	0.0249
410	0.0042	480	0.2416	550	0.7113	620	0.7726	690	0.1620	760	0.0183
420	0.0228	490	0.2645	560	0.7546	630	0.6736	700	0.1194	770	0.0136
430	0.0949	500	0.3721	570	0.8007	640	0.5687	710	0.0874	780	0.0117

CRI & CCT

x	0.3833
y	0.3792
u'	0.2260
v'	0.5031
CRI	82.80
CCT	3941
Duv	0.00032

R Values

R1	81.48
R2	88.93
R3	93.90
R4	81.62
R5	80.75
R6	83.83
R7	86.51
R8	65.41
R9	11.01
R10	72.83
R11	79.97
R12	57.89
R13	83.34
R14	96.36



*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*



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

Photometric Test Report

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L021702105.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L021702105
[TESTLAB] LIGHT LABORATORY, INC.
[ISSUEDATE] 2/14/2017
[MANUFAC] REVOLUTION LIGHTING TECHNOLOGIES
[LUMCAT] 204401-113
[LUMINAIRE] 4FT 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, 11.34W
[TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	1560
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	138
Total Luminaire Watts	11.34
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)	3.63 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	10130	8209	8377
55	9385	7695	8099
65	8313	7300	7914
75	6581	7088	7843
85	3441	7166	7976

**IES INDOOR REPORT
PHOTOMETRIC FILENAME : L021702105.IES**

CANDELA TABULATION

	<u>0.0</u>	<u>22.5</u>	<u>45.0</u>	<u>67.5</u>	<u>90.0</u>
0	316.76	316.76	316.76	316.76	316.76
5	314.71	315.50	315.75	316.12	316.12
10	309.89	310.68	312.38	314.38	314.63
15	301.51	303.21	307.15	311.18	312.97
20	289.88	293.04	300.39	306.74	309.73
25	275.43	280.87	291.50	301.67	305.91
30	259.07	265.63	280.50	295.32	301.17
35	239.48	248.74	268.62	287.72	295.28
40	218.72	230.22	255.71	278.75	288.14
45	196.63	211.20	241.72	269.12	279.92
50	173.88	190.86	226.82	258.33	270.45
55	148.80	169.77	211.45	246.33	259.82
60	123.64	148.97	196.38	233.87	248.20
65	98.23	128.67	180.15	220.34	235.58
70	73.16	109.15	164.41	206.51	222.21
75	48.83	91.01	149.76	192.31	208.26
80	26.24	74.57	135.35	178.07	193.97
85	9.63	60.66	121.36	164.04	179.69
90	1.58	50.03	108.74	150.50	165.33
95	0.58	41.60	97.57	136.76	150.71
100	0.00	35.50	86.86	123.77	137.51
105	0.00	31.14	77.35	111.68	124.31
110	0.00	28.11	68.84	100.47	111.77
115	0.00	25.74	61.53	89.64	99.64
120	0.00	23.83	54.76	79.47	88.60
125	0.00	22.30	48.74	70.37	78.55
130	0.00	20.93	43.35	61.90	68.84
135	0.00	19.39	38.49	54.10	59.79
140	0.00	17.98	33.42	46.96	51.73
145	0.00	16.65	28.36	40.31	44.34
150	0.00	15.11	24.33	34.38	37.45
155	0.00	13.04	21.47	28.36	31.55
160	0.00	11.42	18.73	22.88	26.57
165	0.00	10.50	15.07	18.31	22.09
170	0.00	9.55	11.79	12.91	16.28
175	0.00	8.30	9.67	9.63	8.64
180	0.00	0.00	0.00	0.00	0.00

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L021702105.IES

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	116.83	N.A.	7.50
0-30	251.16	N.A.	16.10
0-40	419.13	N.A.	26.90
0-60	790.92	N.A.	50.70
0-80	1112.14	N.A.	71.30
0-90	1232.96	N.A.	79.00
10-90	1202.93	N.A.	77.10
20-40	302.31	N.A.	19.40
20-50	487.77	N.A.	31.30
40-70	544.40	N.A.	34.90
60-80	321.21	N.A.	20.60
70-80	148.61	N.A.	9.50
80-90	120.83	N.A.	7.70
90-110	171.17	N.A.	11.00
90-120	227.64	N.A.	14.60
90-130	268.32	N.A.	17.20
90-150	312.95	N.A.	20.10
90-180	326.87	N.A.	21.00
110-180	155.70	N.A.	10.00
0-180	1559.83	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	30.03
10-20	86.80
20-30	134.34
30-40	167.97
40-50	185.46
50-60	186.33
60-70	172.61
70-80	148.61
80-90	120.83
90-100	96.22
100-110	74.95
110-120	56.47
120-130	40.69
130-140	27.60
140-150	17.03
150-160	9.22
160-170	3.94
170-180	0.76

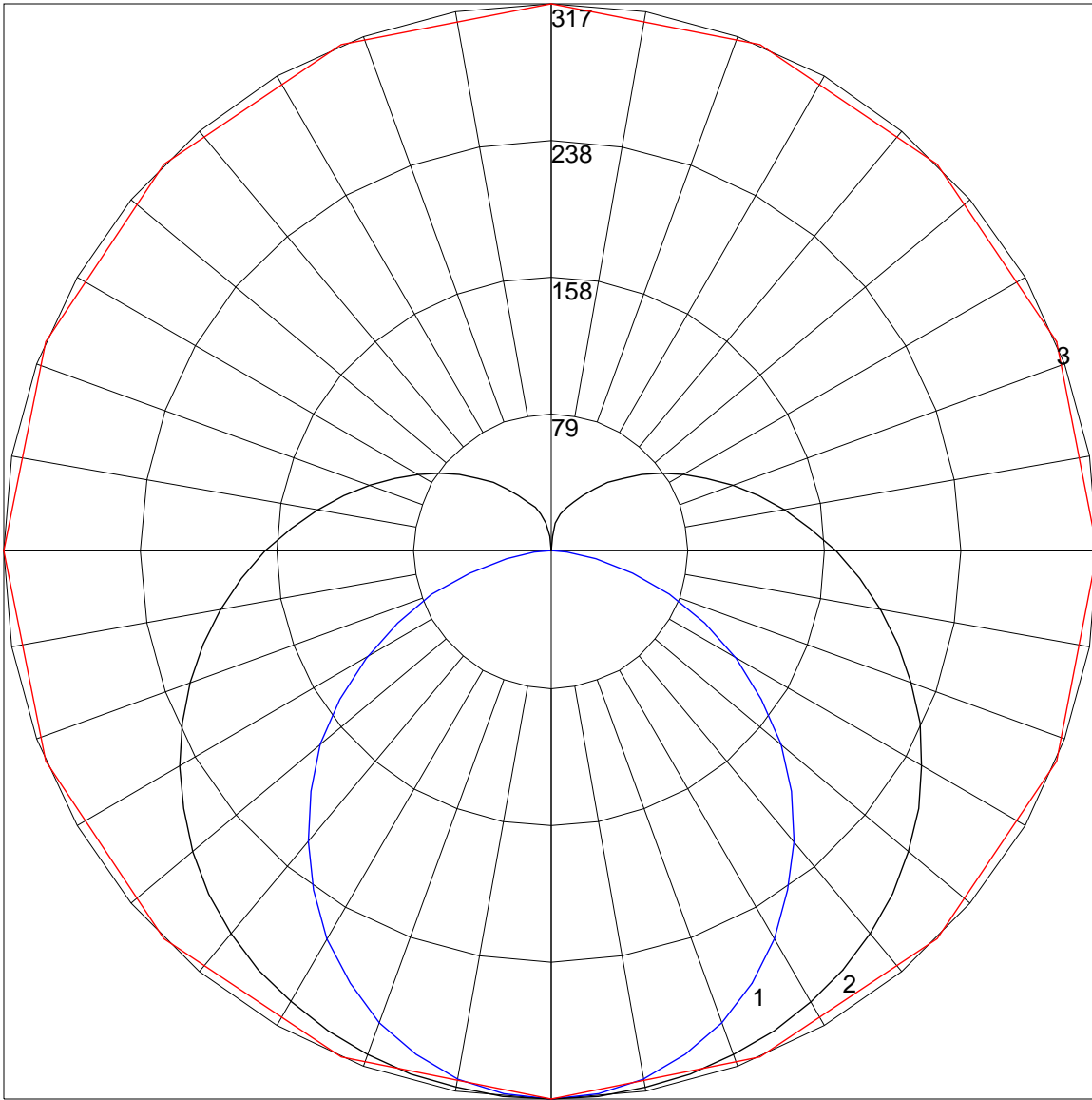
IES INDOOR REPORT
PHOTOMETRIC FILENAME : L021702105.IES

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	109	109	109	109	99	99	99	91	91	91	83	83	83	79
1	101	95	89	84	96	90	85	81	82	78	75	75	72	69	68	65	63	59
2	90	81	73	66	86	77	70	64	70	64	59	64	59	55	58	54	51	47
3	82	70	61	54	77	67	59	52	61	54	48	55	50	45	50	45	42	38
4	74	62	52	45	70	59	50	43	54	46	40	49	43	38	44	39	35	32
5	68	55	45	38	64	52	43	37	48	40	34	43	37	32	39	34	30	27
6	63	49	39	33	59	47	38	32	43	35	30	39	33	28	36	30	26	23
7	58	44	35	29	55	42	34	28	39	31	26	35	29	25	32	27	23	21
8	54	40	31	25	51	38	30	25	35	28	23	32	26	22	30	24	20	18
9	50	36	28	22	48	35	27	22	32	25	21	30	24	19	27	22	18	16
10	47	34	26	20	45	32	25	20	30	23	19	28	22	18	25	20	17	15

POLAR GRAPH



Maximum Candela = 316.76 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.)