



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

Report No: L021702107



Report No: L021702107

Issue Date: 2/15/2017

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

Model Number: 204403-111

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: 2/10/17 - 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

Manufacturer:	Revolution Lighting Technologies
Model Number:	204403-111
Driver Model Number:	N/A
Total Lumens:	2256.44
Input Voltage (VAC/60Hz):	120.00
Input Current (Amp):	0.14
Input Power (W):	17.26
Input Power Factor:	0.99
Current ATHD @ 120V(%):	7%
Current ATHD @ 277V(%):	N/A
Efficacy:	131
Color Rendering Index (CRI):	82
Correlated Color Temperature (K):	3043
Chromaticity Coordinate x:	0.4336
Chromaticity Coordinate y:	0.4025
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:35
Total Operating Time (Hours):	1:05

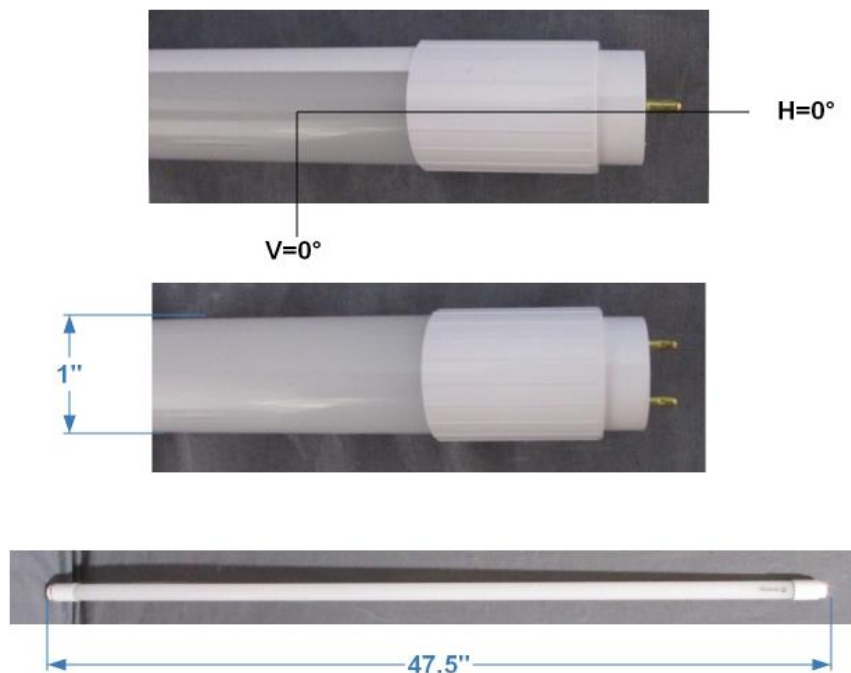
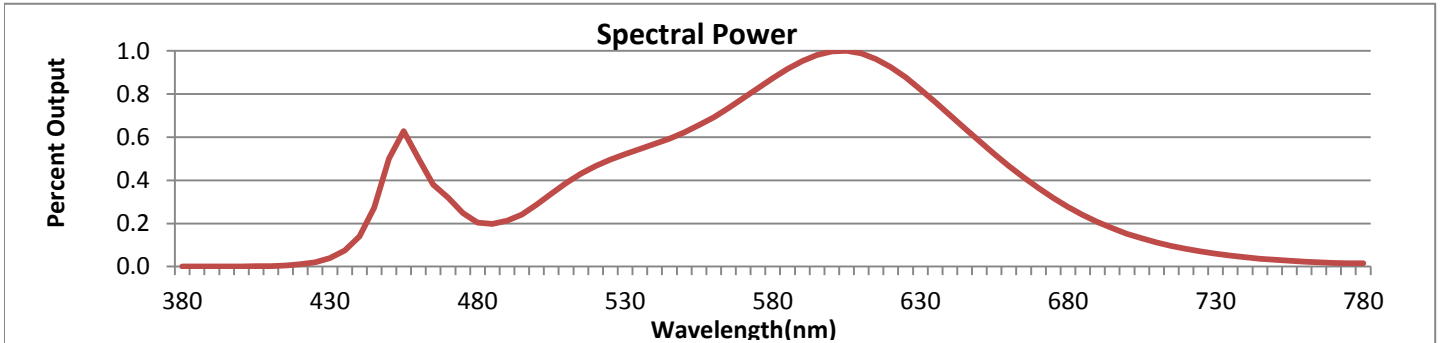


FIG. 1 LUMINAIRE

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



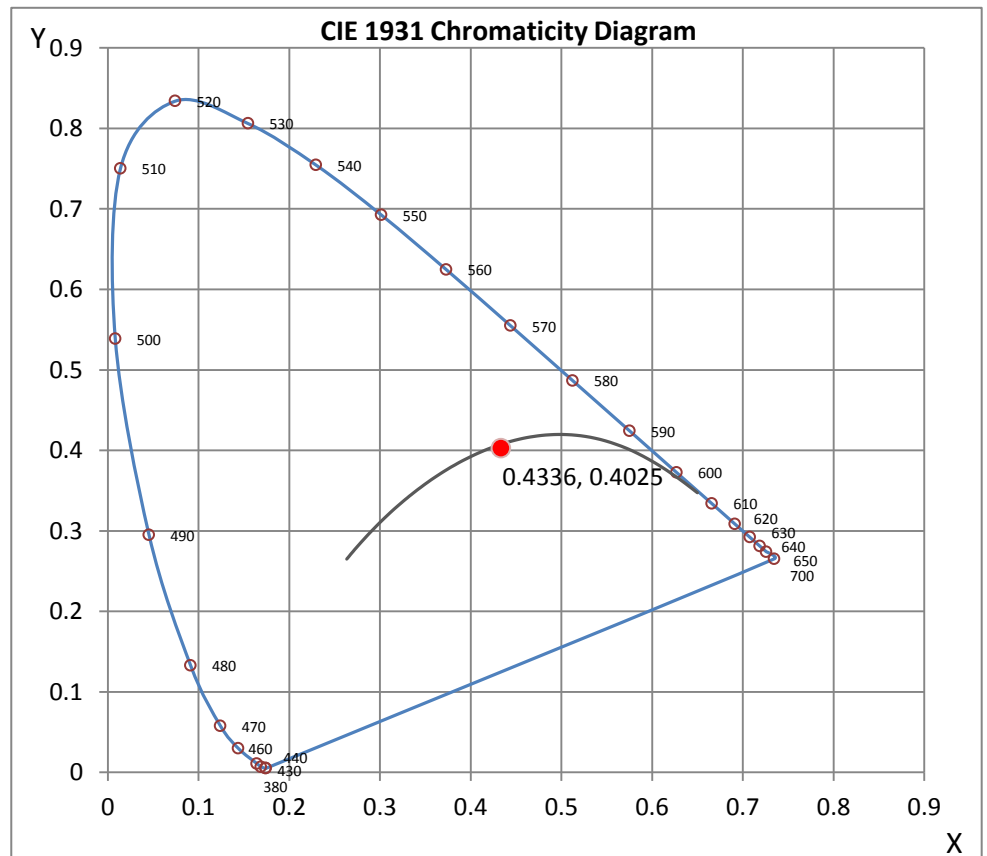
Wavelength	W/m ² nm	440	0.1393	510	0.3874	580	0.8733	650	0.5821	720	0.0815
380	0.0009	450	0.5012	520	0.4666	590	0.9532	660	0.4667	730	0.0595
390	0.0007	460	0.5016	530	0.5216	600	0.9975	670	0.3636	740	0.0431
400	0.0010	470	0.3195	540	0.5682	610	0.9891	680	0.2765	750	0.0316
410	0.0022	480	0.2033	550	0.6219	620	0.9256	690	0.2067	760	0.0232
420	0.0102	490	0.2125	560	0.6926	630	0.8211	700	0.1526	770	0.0171
430	0.0395	500	0.2863	570	0.7807	640	0.7028	710	0.1117	780	0.0146

CRI & CCT

x	0.4336
y	0.4025
u'	0.2491
v'	0.5203
CRI	82.40
CCT	3043
Duv	-0.00017

R Values

R1	81.13
R2	91.33
R3	96.24
R4	79.36
R5	80.52
R6	88.67
R7	82.59
R8	59.10
R9	7.76
R10	79.24
R11	77.91
R12	65.76
R13	83.70
R14	98.64



*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 : L021702107.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
 [TEST] L021702107
 [TESTLAB] LIGHT LABORATORY, INC.
 [ISSUEDATE] 2/15/2017
 [MANUFAC] REVOLUTION LIGHTING TECHNOLOGIES
 [LUMCAT] 204403-111
 [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, 17.26W
 [TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	2256
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	131
Total Luminaire Watts	17.26
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	14678	11829	12124
55	13596	11145	11715
65	12065	10571	11445
75	9545	10248	11393
85	4925	10393	11547

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L021702107.IES

CANDELA TABULATION

	<u>0.0</u>	<u>22.5</u>	<u>45.0</u>	<u>67.5</u>	<u>90.0</u>
0	457.43	457.43	457.43	457.43	457.43
5	454.71	455.25	455.66	456.41	457.37
10	447.32	448.65	451.18	453.92	455.62
15	434.78	437.94	443.71	449.56	452.63
20	418.09	423.16	433.12	443.62	448.15
25	398.24	404.76	420.33	435.86	442.75
30	373.42	383.26	405.14	426.31	435.61
35	345.43	359.38	387.86	415.47	427.22
40	316.87	330.61	369.06	402.77	416.68
45	284.90	306.07	348.30	388.74	405.14
50	251.10	276.51	328.29	372.79	391.60
55	215.56	246.29	306.24	355.61	375.82
60	179.11	216.19	283.90	336.96	358.80
65	142.57	186.67	260.86	318.07	340.70
70	106.20	157.77	238.03	299.43	322.35
75	70.83	132.28	216.52	278.88	302.50
80	38.86	108.16	195.47	258.16	281.25
85	13.78	89.35	176.00	237.65	260.15
90	2.16	72.33	157.65	217.76	239.64
95	0.66	60.16	140.87	198.17	218.55
100	0.00	51.44	125.47	179.48	198.62
105	0.00	45.30	112.10	161.71	179.77
110	0.00	40.73	99.77	145.27	161.76
115	0.00	37.24	88.89	129.54	144.48
120	0.00	34.59	79.09	115.26	128.21
125	0.00	32.43	70.83	101.89	113.26
130	0.00	30.56	62.82	89.51	99.48
135	0.00	28.19	55.76	78.14	87.77
140	0.00	26.03	48.54	68.05	75.23
145	0.00	24.16	41.10	58.58	64.19
150	0.00	22.01	35.00	50.15	54.39
155	0.00	18.81	30.89	41.27	45.84
160	0.00	16.11	27.32	32.97	38.70
165	0.00	14.95	21.59	26.53	32.38
170	0.00	12.95	16.69	18.60	24.25
175	0.00	11.21	13.24	13.37	11.54
180	0.00	0.00	0.00	0.00	0.00

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L021702107.IES

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	168.74	N.A.	7.50
0-30	362.69	N.A.	16.10
0-40	605.22	N.A.	26.80
0-60	1142.75	N.A.	50.60
0-80	1607.93	N.A.	71.30
0-90	1783.17	N.A.	79.00
10-90	1739.8	N.A.	77.10
20-40	436.48	N.A.	19.30
20-50	704.49	N.A.	31.20
40-70	787.30	N.A.	34.90
60-80	465.17	N.A.	20.60
70-80	215.41	N.A.	9.50
80-90	175.24	N.A.	7.80
90-110	247.80	N.A.	11.00
90-120	329.51	N.A.	14.60
90-130	388.44	N.A.	17.20
90-150	453.19	N.A.	20.10
90-180	473.27	N.A.	21.00
110-180	225.47	N.A.	10.00
0-180	2256.44	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	43.37
10-20	125.37
20-30	193.95
30-40	242.53
40-50	268.01
50-60	269.52
60-70	249.77
70-80	215.41
80-90	175.24
90-100	139.27
100-110	108.53
110-120	81.71
120-130	58.94
130-140	40.03
140-150	24.71
150-160	13.35
160-170	5.68
170-180	1.06

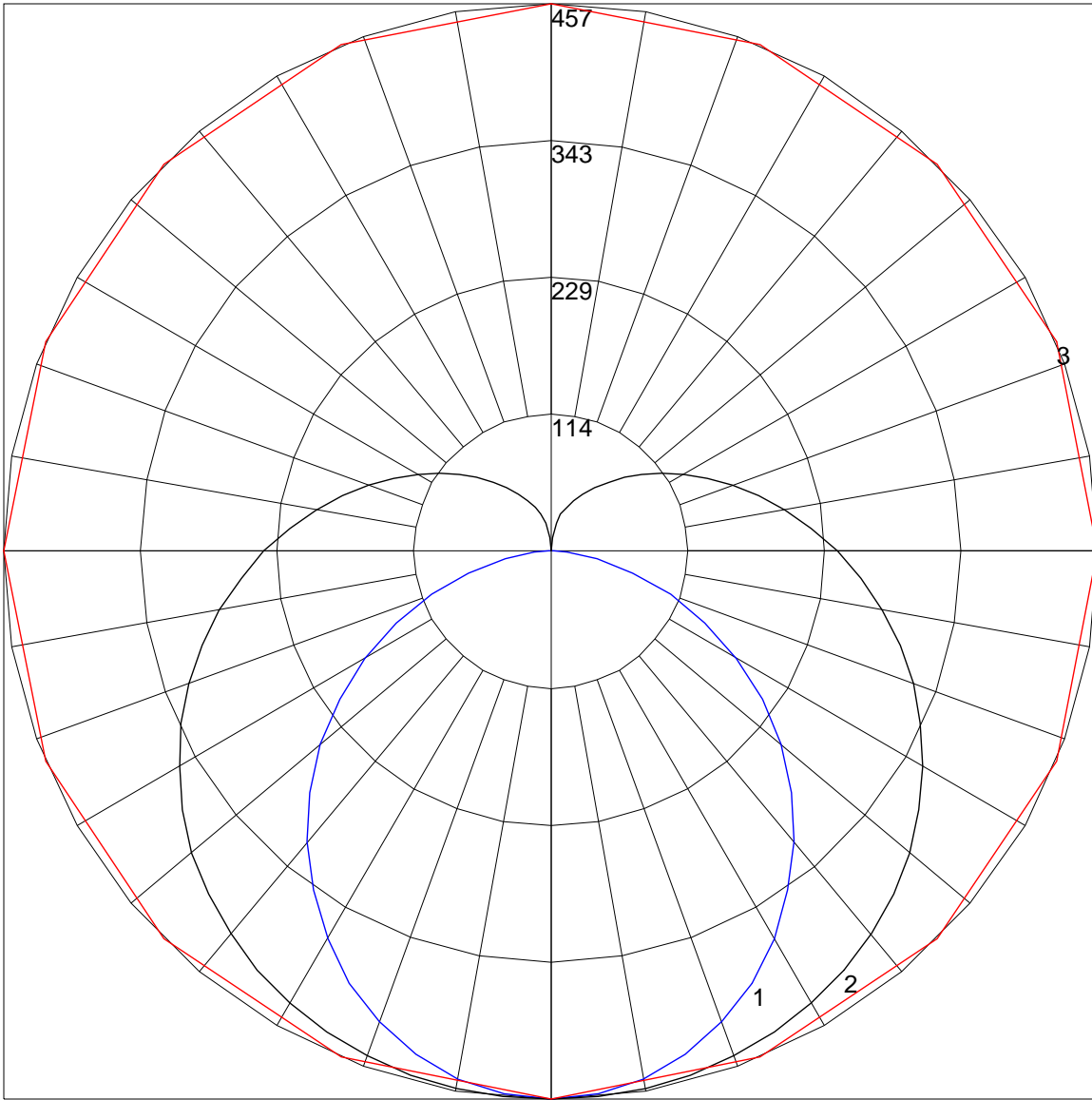
IES INDOOR REPORT
PHOTOMETRIC FILENAME : L021702107.IES

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	50	47
3	82	70	61	54	77	67	59	52	61	54	48	55	50	45	50	45	42	38
4	74	61	52	45	70	59	50	43	53	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	24	32	27	23	21
8	54	40	31	25	51	38	30	24	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 = 457.43 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.)