



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

Report No: L021702106



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Issue Date: 2/15/2017

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

Model Number: 204401-115

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:	204401-115
Driver Model Number:	N/A
Total Lumens:	1616.97
Input Voltage (VAC/60Hz):	120.00
Input Current (Amp):	0.10
Input Power (W):	11.64
Input Power Factor:	0.99
Current ATHD @ 120V(%):	6%
Current ATHD @ 277V(%):	N/A
Efficacy:	139
Color Rendering Index (CRI):	84
Correlated Color Temperature (K):	4936
Chromaticity Coordinate x:	0.3475
Chromaticity Coordinate y:	0.3591
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:45
Total Operating Time (Hours):	1:15

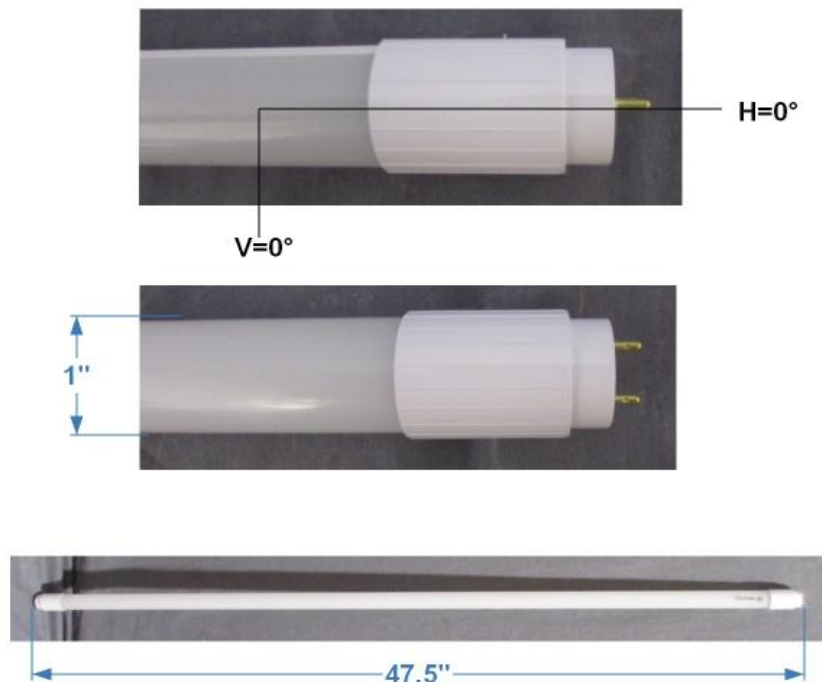
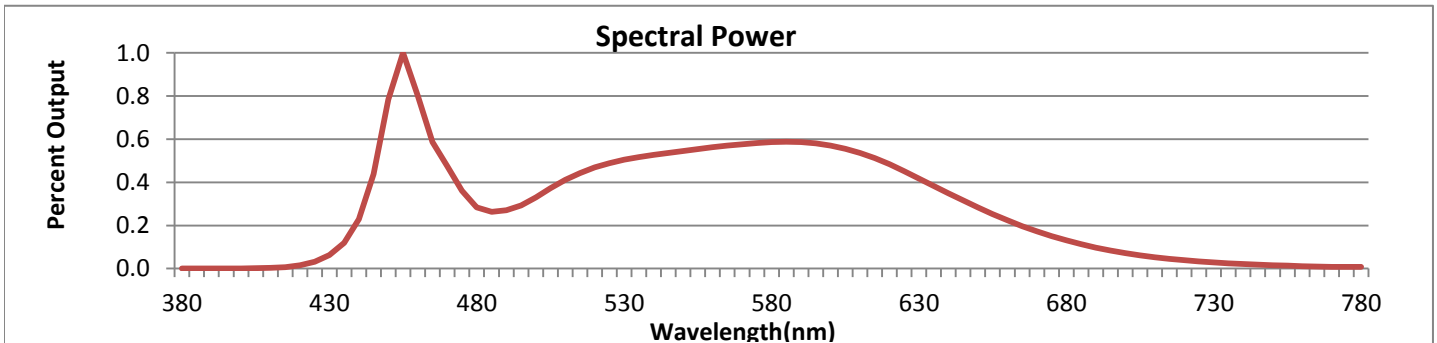


FIG. 1 LUMINAIRE

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



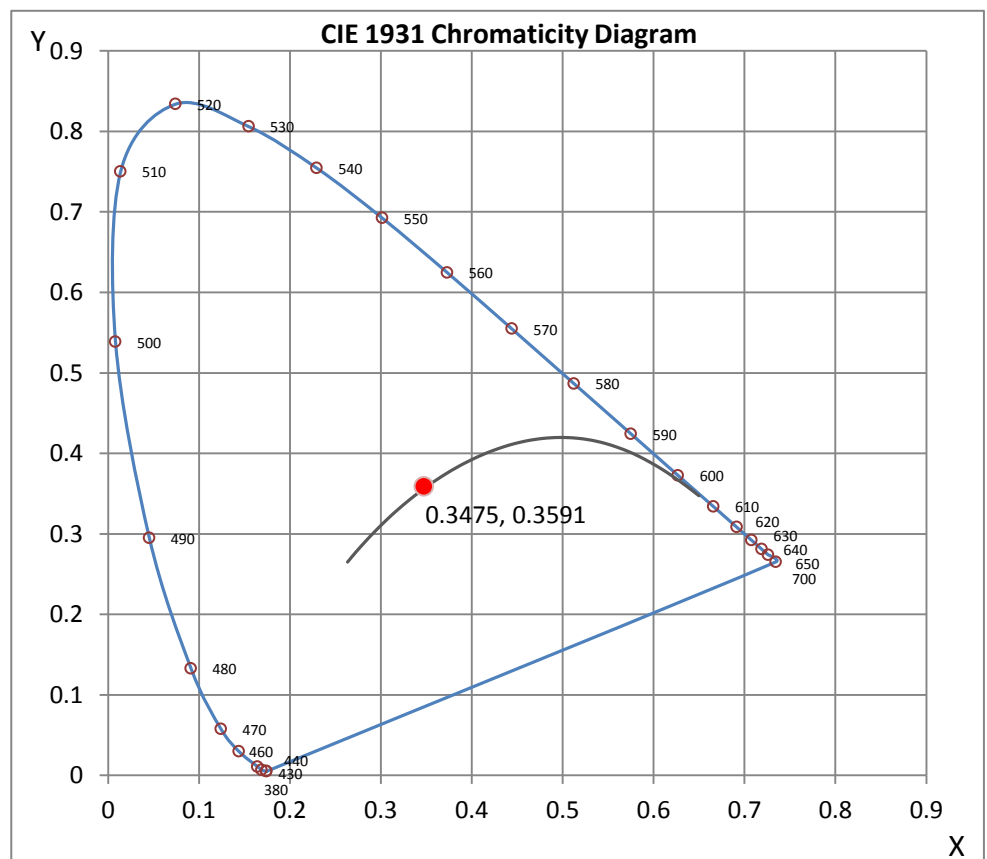
Wavelength	W/m ² nm	440	0.2287	510	0.4115	580	0.5862	650	0.2838	720	0.0390
380	0.0007	450	0.7835	520	0.4694	590	0.5863	660	0.2242	730	0.0285
390	0.0008	460	0.8013	530	0.5043	600	0.5704	670	0.1725	740	0.0209
400	0.0011	470	0.4755	540	0.5267	610	0.5364	680	0.1306	750	0.0154
410	0.0032	480	0.2832	550	0.5456	620	0.4841	690	0.0977	760	0.0114
420	0.0155	490	0.2709	560	0.5625	630	0.4181	700	0.0723	770	0.0085
430	0.0623	500	0.3302	570	0.5769	640	0.3498	710	0.0530	780	0.0073

CRI & CCT

x	0.3475
y	0.3591
u'	0.2102
v'	0.4886
CRI	83.60
CCT	4936
Duv	0.00278

R Values

R1	82.35
R2	91.27
R3	95.02
R4	79.50
R5	80.84
R6	85.55
R7	86.82
R8	67.66
R9	13.49
R10	77.34
R11	78.08
R12	53.29
R13	85.27
R14	97.27



*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 : L021702106.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L021702106
[TESTLAB] LIGHT LABORATORY, INC.
[ISSUEDATE] 2/15/2017
[MANUFAC] REVOLUTION LIGHTING TECHNOLOGIES
[LUMCAT] 204401-115
[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, 11.64W
[TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	1617
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	139
Total Luminaire Watts	11.64
Ballast Factor	1.00
CIE Type	Semi-Direct
Spacing Criterion (0-180)	1.24
Spacing Criterion (90-270)	1.46
Spacing Criterion (Diagonal)	1.50
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	10019	8088	8200
55	9375	7648	8014
65	8418	7371	7947
75	6692	7281	8028
85	3531	7558	8355

**IES INDOOR REPORT
PHOTOMETRIC FILENAME : L021702106.IES**

CANDELA TABULATION

	<u>0.0</u>	<u>22.5</u>	<u>45.0</u>	<u>67.5</u>	<u>90.0</u>
0	304.70	304.70	304.70	304.70	304.70
5	303.42	303.75	303.87	304.00	304.25
10	299.18	300.14	301.51	302.84	303.58
15	291.63	293.29	296.52	300.63	301.26
20	280.25	283.70	290.38	296.77	299.10
25	267.46	272.15	282.28	292.17	295.86
30	252.85	258.83	273.03	286.52	292.04
35	235.41	243.75	262.35	280.54	287.22
40	215.90	227.02	250.56	272.44	281.08
45	194.47	208.75	238.15	264.31	274.02
50	172.88	188.99	224.16	254.96	266.22
55	148.64	169.44	210.17	244.29	257.08
60	124.39	149.72	196.17	233.33	247.28
65	99.48	129.95	181.89	221.67	236.57
70	74.15	110.48	167.44	209.92	225.20
75	49.66	93.04	153.83	197.46	213.16
80	26.74	77.39	140.54	184.72	200.78
85	9.88	64.06	128.00	172.26	188.24
90	1.58	53.68	116.46	159.93	175.71
95	0.50	45.92	106.12	147.76	162.75
100	0.00	40.56	96.16	136.18	150.88
105	0.00	36.99	87.60	125.05	138.75
110	0.00	34.50	79.96	114.47	127.05
115	0.00	32.68	73.11	104.21	115.67
120	0.00	31.55	66.51	94.66	105.46
125	0.00	30.93	60.78	85.61	95.16
130	0.00	30.64	55.64	76.89	85.11
135	0.00	29.64	51.07	68.75	75.81
140	0.00	28.52	46.21	61.66	67.68
145	0.00	27.53	41.10	55.10	59.79
150	0.00	25.91	37.16	49.24	52.81
155	0.00	22.13	34.42	42.76	47.08
160	0.00	18.35	31.39	36.62	42.18
165	0.00	17.15	25.08	30.97	37.28
170	0.00	15.36	19.22	21.88	27.07
175	0.00	12.79	15.74	15.65	14.37
180	0.00	0.00	0.00	0.00	0.00

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L021702106.IES

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	112.78	N.A.	7.00
0-30	243.00	N.A.	15.00
0-40	407.10	N.A.	25.20
0-60	774.86	N.A.	47.90
0-80	1101.1	N.A.	68.10
0-90	1228.04	N.A.	75.90
10-90	1199.11	N.A.	74.20
20-40	294.32	N.A.	18.20
20-50	476.90	N.A.	29.50
40-70	541.66	N.A.	33.50
60-80	326.24	N.A.	20.20
70-80	152.34	N.A.	9.40
80-90	126.94	N.A.	7.90
90-110	188.94	N.A.	11.70
90-120	255.61	N.A.	15.80
90-130	306.19	N.A.	18.90
90-150	366.87	N.A.	22.70
90-180	388.93	N.A.	24.10
110-180	199.99	N.A.	12.40
0-180	1616.97	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	28.93
10-20	83.85
20-30	130.22
30-40	164.10
40-50	182.59
50-60	185.18
60-70	173.90
70-80	152.34
80-90	126.94
90-100	104.34
100-110	84.60
110-120	66.66
120-130	50.59
130-140	36.41
140-150	24.27
150-160	14.31
160-170	6.51
170-180	1.24

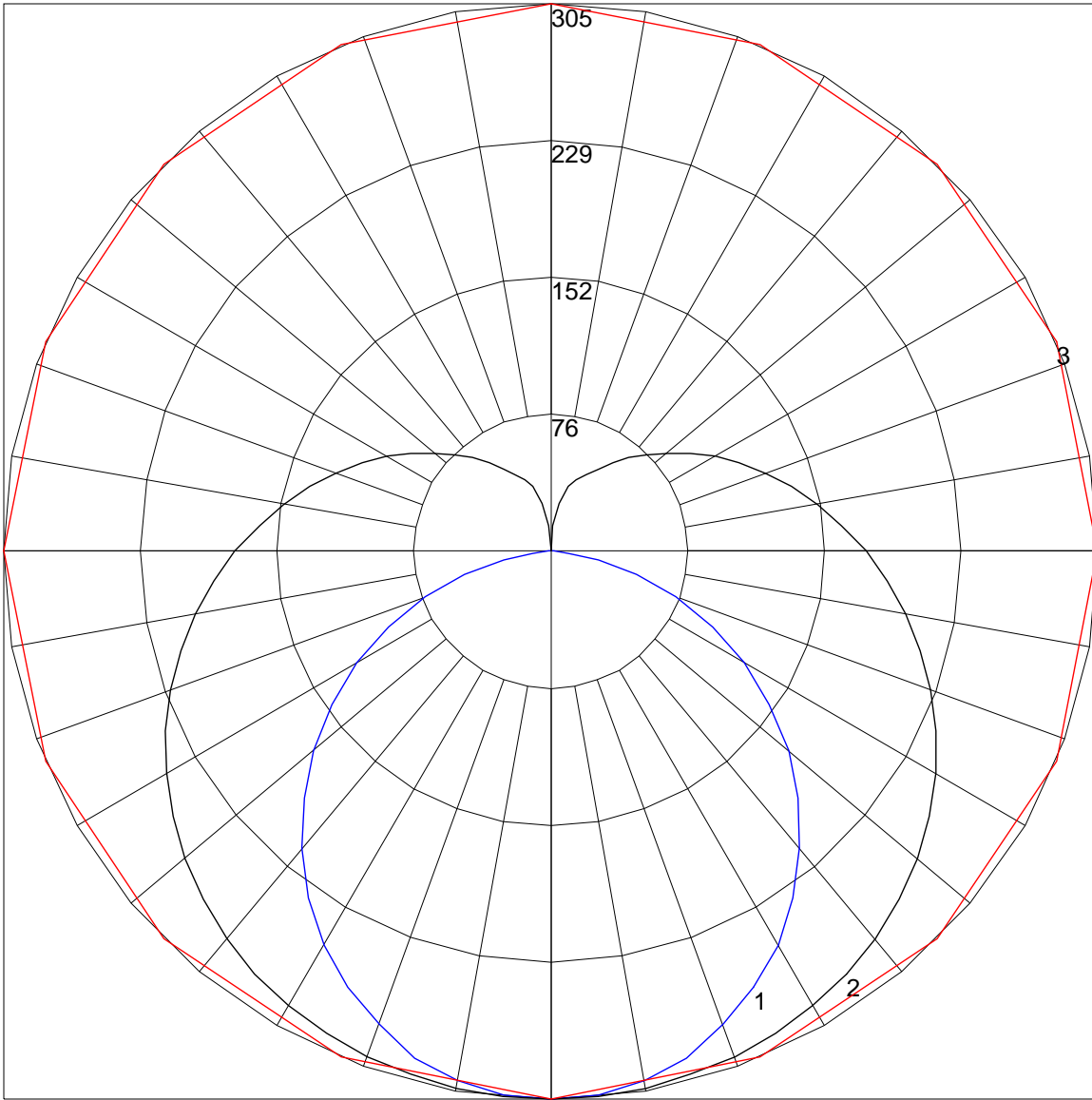
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COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	113	113	113	113	113	108	108	108	108	98	98	98	88	88	88	80	80	80	76
1	100	94	89	84	84	95	89	84	80	81	77	73	72	69	67	65	63	60	57
2	90	80	72	66	66	85	76	69	63	69	63	58	62	57	53	55	52	48	45
3	81	69	60	53	53	76	66	58	51	59	53	47	53	48	43	48	43	40	36
4	74	61	51	44	44	70	58	49	43	52	45	39	47	41	36	42	37	33	30
5	68	54	44	37	37	64	51	43	36	46	39	34	42	36	31	38	33	28	26
6	62	48	39	32	32	59	46	37	31	42	34	29	38	32	27	34	29	25	22
7	57	43	34	28	28	54	41	33	27	38	31	25	34	28	24	31	26	22	19
8	53	39	31	25	25	50	38	30	24	34	27	22	31	25	21	28	23	19	17
9	50	36	28	22	22	47	34	27	21	32	25	20	29	23	19	26	21	17	15
10	46	33	25	20	20	44	32	24	19	29	22	18	27	21	17	24	19	16	14

POLAR GRAPH



Maximum Candela = 304.7 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.)