



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

Report No: L071600303

Date: 7/6/2016



NVLAP LAB CODE 200927-0

Report No: L071600303

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

Model Number: 204002-411

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 204002-411. Received in working and undamaged condition. No modifications were necessary.

Testing Condition: Fixture is tested with no special conditions.

Sample Arrival Date: 7/1/16

Date of Tests: 7/5/16 - 7/6/16

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 Technologies
Model Number:	204002-411
Driver Model Number:	N/A
Total Lumens:	2009.30
Input Voltage (VAC/60Hz):	120.00
Input Current (Amp):	0.13
Input Power (W):	15.11
Input Power Factor:	0.99
Current ATHD @ 120V(%):	9%
Current ATHD @ 277V(%):	N/A
Efficacy:	133
Color Rendering Index (CRI):	83
Correlated Color Temperature (K):	3023
Chromaticity Coordinate x:	0.4346
Chromaticity Coordinate y:	0.4020
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:35
Total Operating Time (Hours):	1:10
Off State Power(W):	0.00

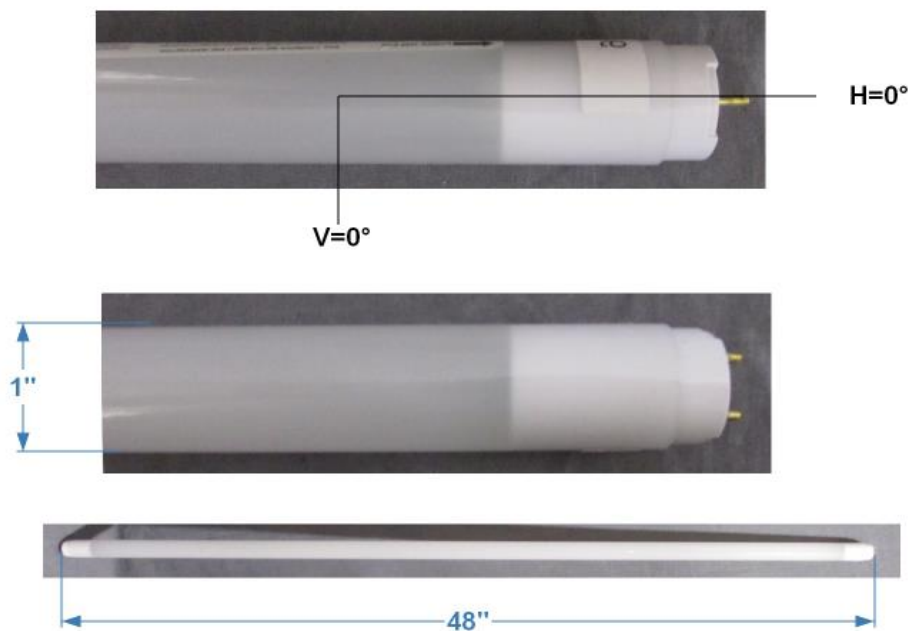
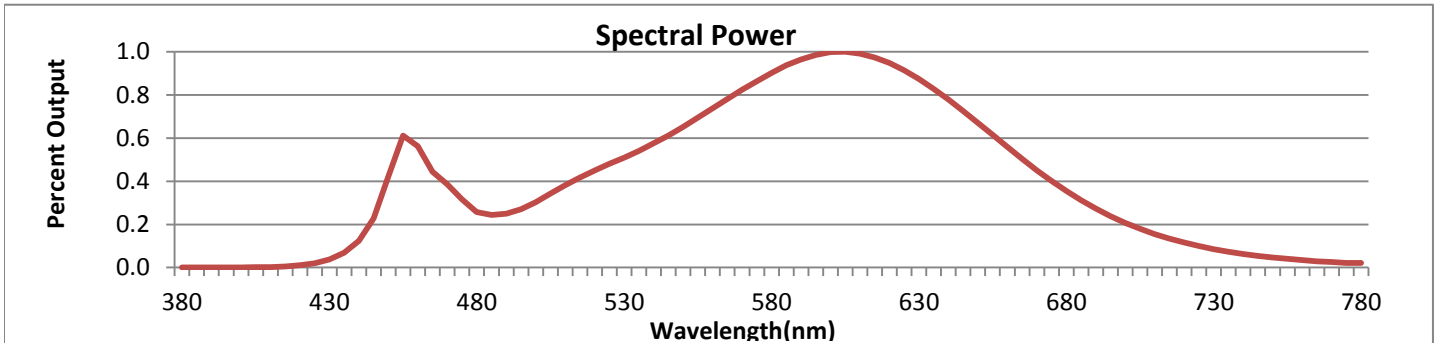


FIG. 1 LUMINAIRE

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



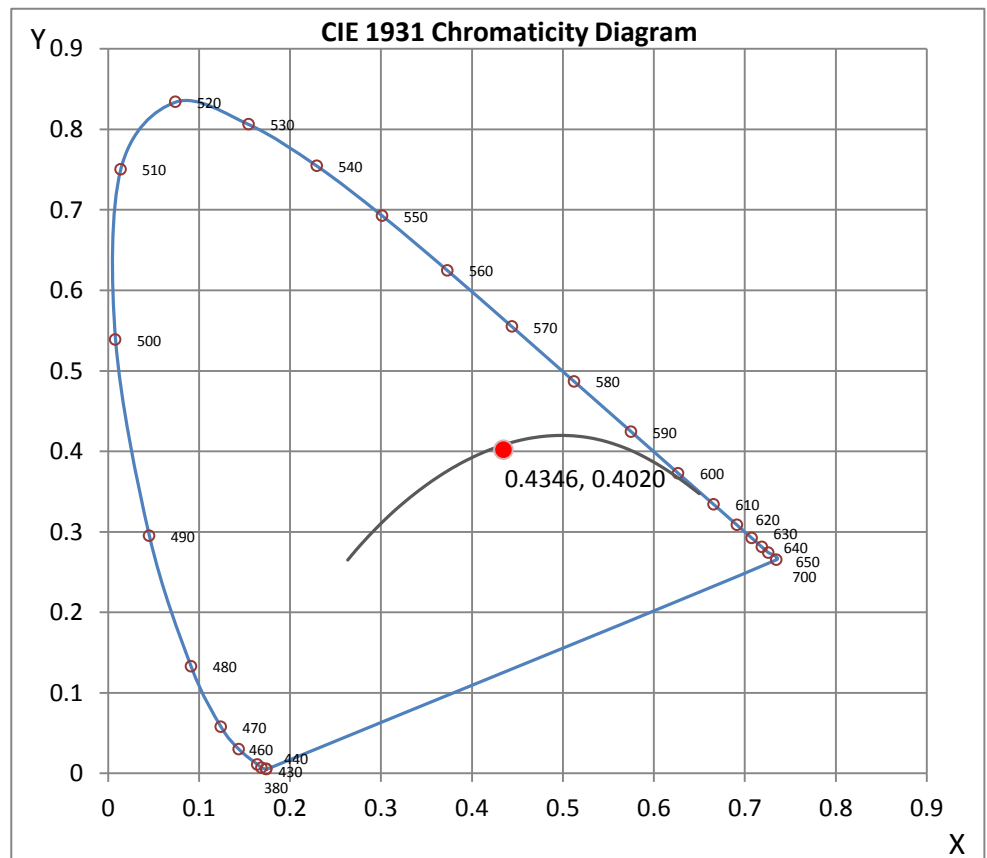
Wavelength	W/m ² nm	440	0.1231	510	0.3819	580	0.9024	650	0.6714	720	0.1158
380	0.0008	450	0.4218	520	0.4503	590	0.9654	660	0.5599	730	0.0856
390	0.0007	460	0.5631	530	0.5099	600	0.9986	670	0.4507	740	0.0629
400	0.0011	470	0.3869	540	0.5756	610	0.9917	680	0.3547	750	0.0465
410	0.0023	480	0.2579	550	0.6523	620	0.9492	690	0.2731	760	0.0341
420	0.0102	490	0.2501	560	0.7378	630	0.8742	700	0.2068	770	0.0252
430	0.0377	500	0.3037	570	0.8242	640	0.7793	710	0.1551	780	0.0215

CRI & CCT

x	0.4346
y	0.4020
u'	0.2500
v'	0.5202
CRI	83.10
CCT	3023
Duv	-0.00051

R Values

R1	81.84
R2	92.47
R3	95.77
R4	78.45
R5	81.02
R6	89.50
R7	83.41
R8	62.60
R9	17.90
R10	81.57
R11	75.73
R12	67.53
R13	84.45
R14	98.44



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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:

Test Report Reviewed by:

Jeff Ahn
 Engineering Manager

Steve Kang
 Quality Assurance

**Attached are photometric data reports. Total number of pages: 9*

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



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Photometric Test Report

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L071600303.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
 [TEST] L071600303
 [TESTLAB] LIGHT LABORATORY, INC.
 [ISSUEDATE] 7/6/2016
 [MANUFAC] REVOLUTION LIGHTING TECHNOLOGIES
 [LUMCAT] 204002-411
 [LUMINAIRE] 15W 4FT 3000K G4 TUBE LAMP 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] 120VAC, 15.11W
 [TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	2009
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	133
Total Luminaire Watts	15.11
Ballast Factor	1.00
CIE Type	Semi-Direct
Spacing Criterion (0-180)	1.18
Spacing Criterion (90-270)	1.36
Spacing Criterion (Diagonal)	1.42
Basic Luminous Shape	Hor. Cylinder Along Length
Luminous Length (0-180)	3.67 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	777816	15796	12880
55	494375	13334	11632
65	286786	11014	10289
75	130080	8957	8925
85	20724	7233	7603

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L071600303.IES

CANDELA TABULATION

	<u>0.0</u>	<u>22.5</u>	<u>45.0</u>	<u>67.5</u>	<u>90.0</u>
0	437.03	437.03	437.03	437.03	437.03
5	434.53	434.83	435.08	435.71	435.71
10	426.56	427.57	429.54	431.47	432.52
15	413.39	415.45	420.10	424.80	426.82
20	395.69	398.71	407.22	415.32	418.43
25	373.54	378.95	391.37	403.83	408.36
30	342.49	355.46	372.95	389.86	396.44
35	320.43	330.54	352.44	374.46	382.93
40	289.63	301.80	331.25	357.43	367.75
45	257.08	272.98	308.64	338.80	351.64
50	222.51	242.82	284.73	321.98	335.03
55	189.29	212.61	261.02	302.18	317.57
60	155.64	183.37	237.95	283.01	299.28
65	121.49	155.85	215.93	263.25	280.91
70	88.27	130.05	195.03	243.95	262.20
75	58.73	106.98	175.78	225.53	243.66
80	31.38	86.84	157.86	207.45	225.53
85	9.65	71.44	142.01	190.04	207.58
90	0.50	59.40	127.87	174.27	190.38
95	0.00	51.14	115.41	159.29	174.18
100	0.00	46.11	104.71	145.61	159.84
105	0.00	43.50	96.15	133.41	147.00
110	0.00	42.46	88.81	122.79	134.83
115	0.00	42.75	82.90	113.10	123.42
120	0.00	43.84	77.95	104.50	113.94
125	0.00	45.52	74.09	96.95	105.55
130	0.00	47.32	70.98	90.24	97.50
135	0.00	47.91	68.59	85.04	90.53
140	0.00	47.66	65.24	79.83	84.66
145	0.00	46.82	61.17	75.47	79.46
150	0.00	43.29	57.85	71.61	74.59
155	0.00	37.42	56.09	65.82	70.56
160	0.00	31.00	52.31	59.28	67.12
165	0.00	27.19	43.55	51.77	63.18
170	0.00	22.53	32.01	37.88	45.98
175	0.00	15.65	22.36	23.95	20.31
180	0.00	0.00	0.00	0.00	0.00

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L071600303.IES

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	159.93	N.A.	8.00
0-30	340.25	N.A.	16.90
0-40	560.69	N.A.	27.90
0-60	1027.92	N.A.	51.20
0-80	1410.11	N.A.	70.20
0-90	1550.67	N.A.	77.20
10-90	1509.31	N.A.	75.10
20-40	400.76	N.A.	19.90
20-50	637.39	N.A.	31.70
40-70	674.73	N.A.	33.60
60-80	382.18	N.A.	19.00
70-80	174.68	N.A.	8.70
80-90	140.56	N.A.	7.00
90-110	205.17	N.A.	10.20
90-120	280.02	N.A.	13.90
90-130	340.58	N.A.	17.00
90-150	423.41	N.A.	21.10
90-180	458.63	N.A.	22.80
110-180	253.46	N.A.	12.60
0-180	2009.3	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	41.36
10-20	118.57
20-30	180.32
30-40	220.44
40-50	236.63
50-60	230.60
60-70	207.50
70-80	174.68
80-90	140.56
90-100	113.16
100-110	92.01
110-120	74.85
120-130	60.56
130-140	47.77
140-150	35.06
150-160	22.52
160-170	10.80
170-180	1.89

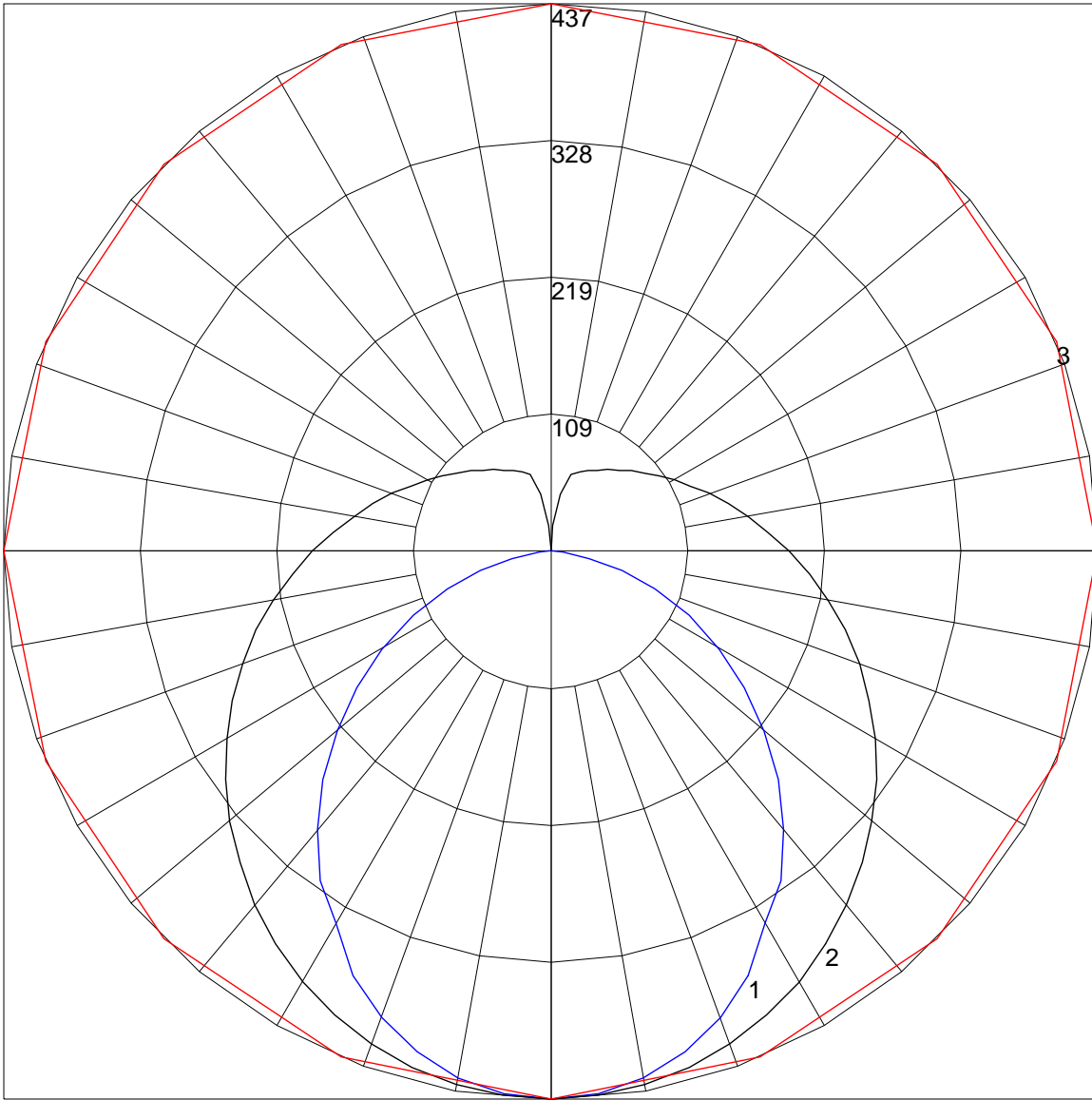
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COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	114	114	114	114	114	108	108	108	108	98	98	98	89	89	89	81	81	81	77
1	101	95	90	85	85	96	90	86	82	82	78	75	74	71	68	67	65	63	59
2	91	81	74	67	67	86	78	71	65	70	65	60	64	59	55	57	54	51	47
3	82	71	62	55	55	78	68	59	53	61	55	49	55	50	45	50	46	42	39
4	75	62	53	46	46	71	59	51	44	54	47	41	49	43	38	44	39	35	32
5	69	55	46	39	39	65	53	44	38	48	41	35	44	38	33	40	35	31	28
6	63	50	40	34	34	60	47	39	33	43	36	31	39	33	29	36	31	27	24
7	59	45	36	30	30	55	43	35	29	39	32	27	36	30	25	33	27	24	21
8	54	41	32	26	26	51	39	31	25	36	29	24	33	27	22	30	25	21	19
9	51	37	29	23	23	48	36	28	23	33	26	21	30	24	20	28	23	19	17
10	47	34	26	21	21	45	33	25	20	30	24	19	28	22	18	26	21	17	15

POLAR GRAPH



Maximum Candela = 437.03 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.)