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Report No: L071600304

Date: 7/6/2016



NVLAP LAB CODE 200927-0

Report No: L071600304

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

Model Number: 204002-415

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 204002-415 . 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:	204002-415
Driver Model Number:	N/A
Total Lumens:	2269.86
Input Voltage (VAC/60Hz):	120.00
Input Current (Amp):	0.13
Input Power (W):	15.48
Input Power Factor:	0.99
Current ATHD @ 120V(%):	9%
Current ATHD @ 277V(%):	N/A
Efficacy:	147
Color Rendering Index (CRI):	82
Correlated Color Temperature (K):	5016
Chromaticity Coordinate x:	0.3453
Chromaticity Coordinate y:	0.3579
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:40
Total Operating Time (Hours):	1:15
Off State Power(W):	0.00

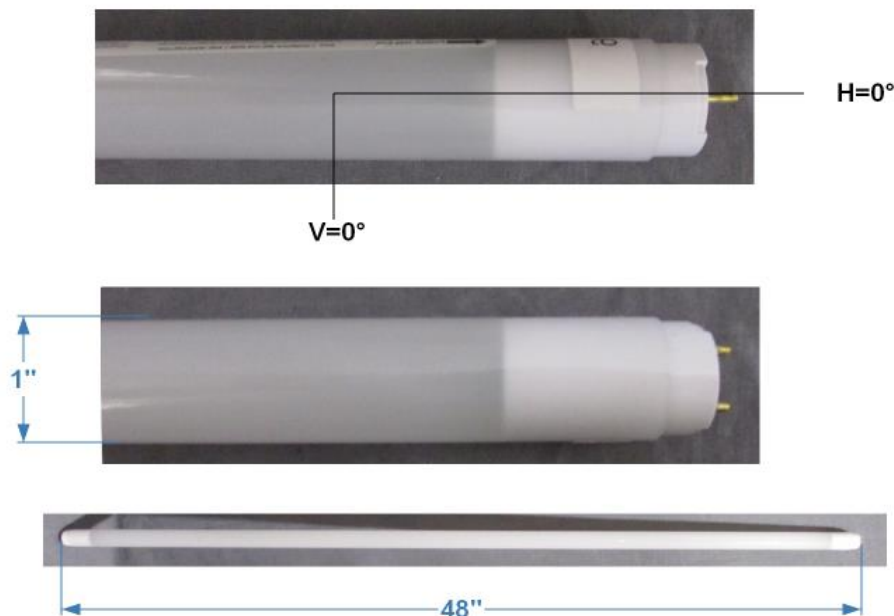
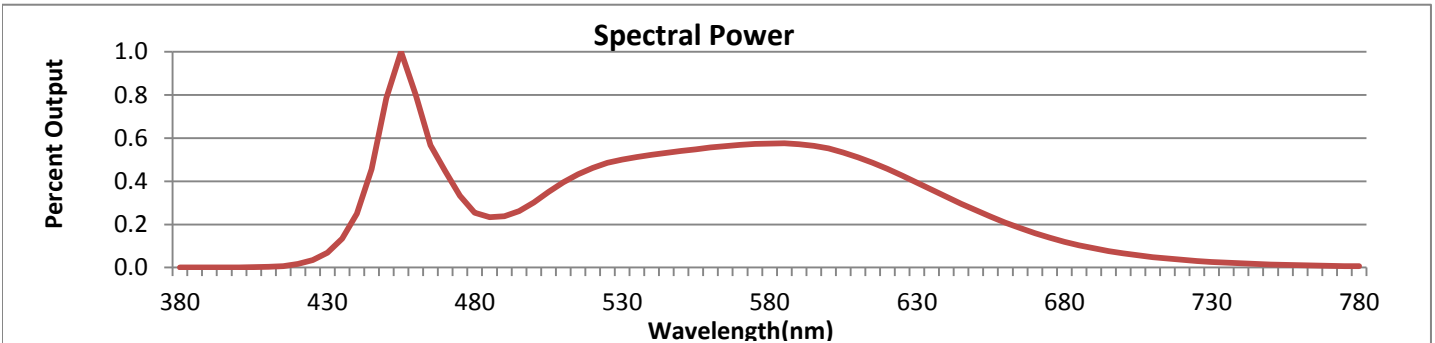


FIG. 1 LUMINAIRE

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



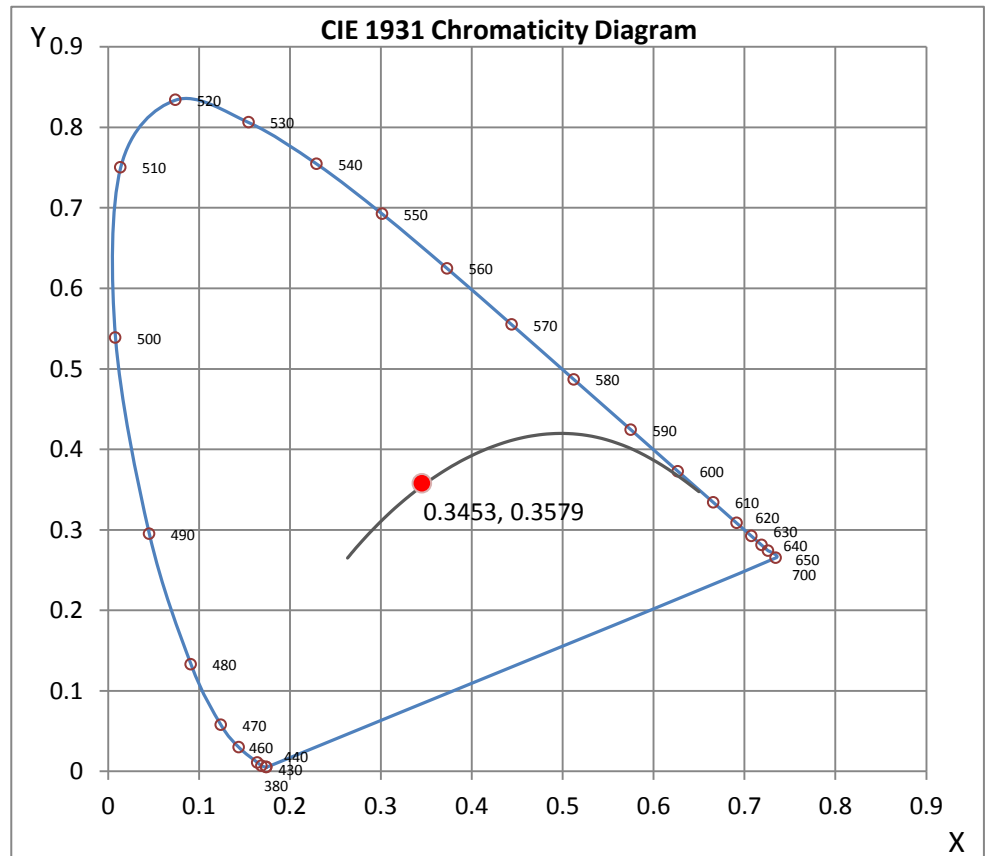
Wavelength	W/m ² nm	440	0.2499	510	0.3949	580	0.5751	650	0.2656	720	0.0357
380	0.0007	450	0.7862	520	0.4625	590	0.5723	660	0.2085	730	0.0264
390	0.0009	460	0.8004	530	0.5006	600	0.5518	670	0.1591	740	0.0196
400	0.0012	470	0.4470	540	0.5228	610	0.5116	680	0.1198	750	0.0146
410	0.0031	480	0.2546	550	0.5411	620	0.4576	690	0.0891	760	0.0109
420	0.0163	490	0.2383	560	0.5565	630	0.3942	700	0.0659	770	0.0082
430	0.0687	500	0.3022	570	0.5691	640	0.3284	710	0.0484	780	0.0071

CRI & CCT

x	0.3453
y	0.3579
u'	0.2091
v'	0.4877
CRI	82.30
CCT	5016
Duv	0.00307

R Values

R1	80.63
R2	89.28
R3	93.41
R4	79.70
R5	80.01
R6	83.41
R7	86.19
R8	65.42
R9	5.32
R10	72.86
R11	77.85
R12	55.80
R13	83.29
R14	96.37



*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.

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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 : L071600304.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
 [TEST] L071600304
 [TESTLAB] LIGHT LABORATORY, INC.
 [ISSUEDATE] 7/6/2016
 [MANUFAC] REVOLUTION LIGHTING TECHNOLOGIES
 [LUMCAT] 204002-415
 [LUMINAIRE] 15W 4FT 5000K 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, 15.48W
 [TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	2270
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	147
Total Luminaire Watts	15.48
Ballast Factor	1.00
CIE Type	Semi-Direct
Spacing Criterion (0-180)	1.20
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	875542	17627	14545
55	556378	15074	13098
65	324414	12465	11635
75	153137	10145	10099
85	24869	8198	8602

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L071600304.IES

CANDELA TABULATION

	<u>0.0</u>	<u>22.5</u>	<u>45.0</u>	<u>67.5</u>	<u>90.0</u>
0	492.11	492.11	492.11	492.11	492.11
5	489.74	489.74	490.08	490.25	490.25
10	480.85	481.73	483.91	485.88	486.55
15	465.66	468.31	473.51	478.21	480.18
20	445.53	449.85	458.99	467.51	471.28
25	421.61	427.61	441.20	454.50	460.12
30	391.91	400.93	420.73	439.02	446.78
35	359.69	372.15	397.41	421.87	431.60
40	326.22	337.88	373.03	402.86	415.07
45	289.38	308.64	344.42	382.98	397.11
50	251.37	274.57	322.10	361.66	378.15
55	213.03	240.72	295.09	337.58	357.60
60	174.85	208.08	269.71	319.46	337.37
65	137.43	176.70	244.37	297.81	317.66
70	101.02	147.04	220.75	276.50	295.67
75	69.14	121.53	199.10	255.57	275.71
80	35.66	98.59	178.92	235.43	255.07
85	11.58	82.52	160.97	215.67	234.85
90	0.67	67.42	144.94	197.68	215.55
95	0.00	58.15	130.97	180.69	197.51
100	0.00	52.31	118.98	165.63	180.98
105	0.00	49.34	109.03	151.66	166.30
110	0.00	48.16	100.60	139.45	152.62
115	0.00	48.41	93.76	128.20	140.12
120	0.00	49.63	88.01	118.35	128.96
125	0.00	51.27	83.86	109.87	119.06
130	0.00	53.28	80.21	102.15	110.25
135	0.00	53.82	77.23	95.48	102.45
140	0.00	53.66	73.50	89.82	95.40
145	0.00	52.65	69.01	84.99	89.19
150	0.00	48.71	65.15	80.67	84.16
155	0.00	42.16	63.10	73.96	79.62
160	0.00	34.27	58.77	66.33	75.60
165	0.00	30.42	49.21	57.94	70.73
170	0.00	25.63	35.45	41.32	51.85
175	0.00	17.62	25.42	26.93	22.91
180	0.00	0.00	0.00	0.00	0.00

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L071600304.IES

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	180.15	N.A.	7.90
0-30	383.48	N.A.	16.90
0-40	631.87	N.A.	27.80
0-60	1158.44	N.A.	51.00
0-80	1591.32	N.A.	70.10
0-90	1750.94	N.A.	77.10
10-90	1704.36	N.A.	75.10
20-40	451.72	N.A.	19.90
20-50	718.27	N.A.	31.60
40-70	761.35	N.A.	33.50
60-80	432.88	N.A.	19.10
70-80	198.10	N.A.	8.70
80-90	159.61	N.A.	7.00
90-110	232.81	N.A.	10.30
90-120	317.60	N.A.	14.00
90-130	386.08	N.A.	17.00
90-150	479.39	N.A.	21.10
90-180	518.93	N.A.	22.90
110-180	286.12	N.A.	12.60
0-180	2269.86	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	46.58
10-20	133.57
20-30	203.33
30-40	248.39
40-50	266.55
50-60	260.02
60-70	234.79
70-80	198.10
80-90	159.61
90-100	128.41
100-110	104.40
110-120	84.79
120-130	68.48
130-140	53.83
140-150	39.48
150-160	25.33
160-170	12.09
170-180	2.12

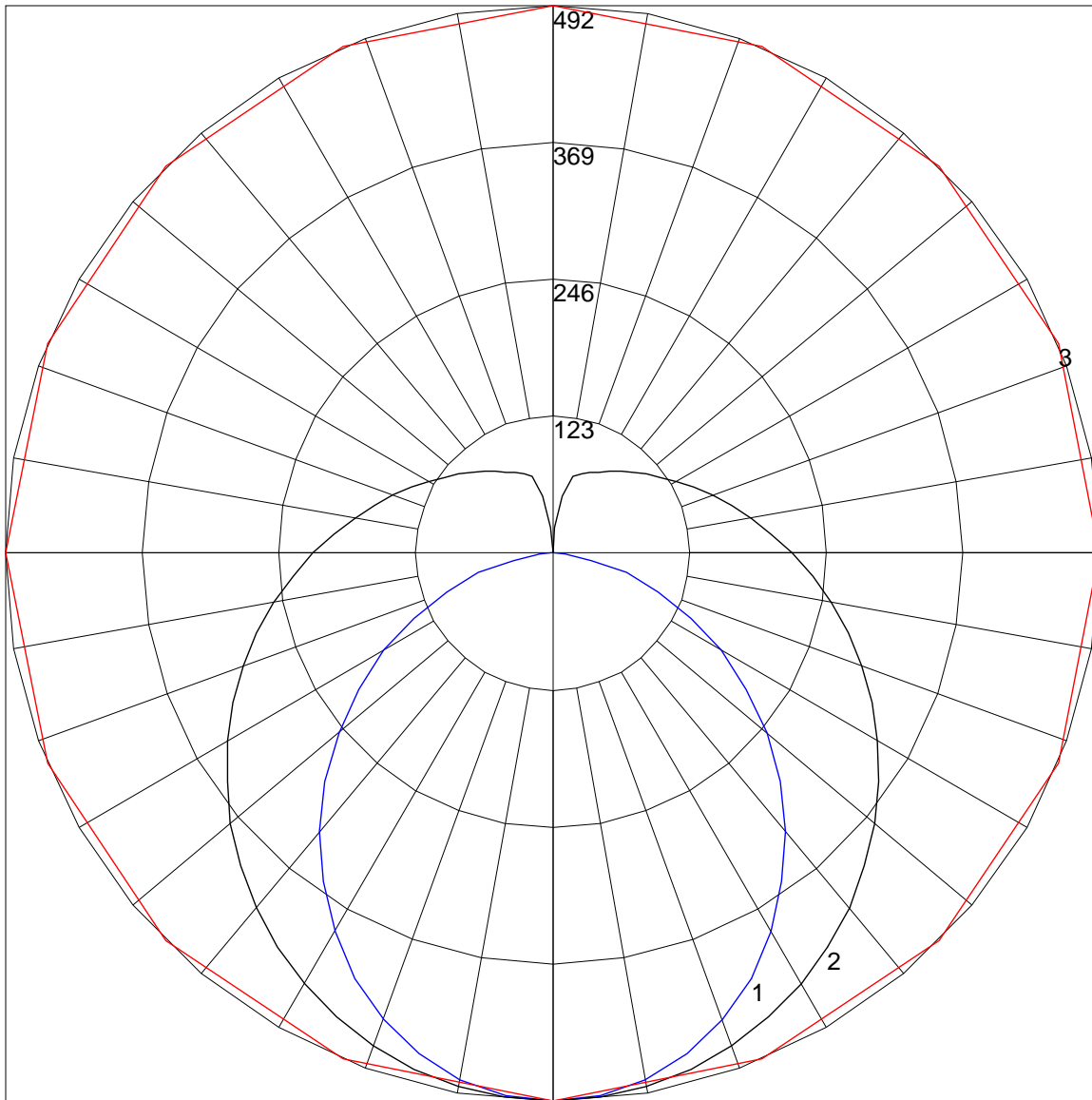
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COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	62	59
2	91	81	74	67	67	86	78	71	65	70	65	60	63	59	55	57	54	50	47
3	82	71	62	55	55	78	67	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	30	28
6	63	50	40	34	34	60	47	39	33	43	36	31	39	33	29	36	31	27	24
7	58	45	36	30	30	55	43	35	29	39	32	27	36	30	25	33	27	23	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 = 492.11 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.)