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

NVLAP TESTING
NVLAP LAB CODE 200927-0

Report No: **L021702103** **Issue Date: 2/14/2017**

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

Model Number: **202400-115**

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: 2/9/17 - 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

*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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Test Summary	
Manufacturer:	Revolution Lighting Technologies
Model Number:	202400-115
Driver Model Number:	N/A
Total Lumens:	1118.49
Input Voltage (VAC/60Hz):	120.01
Input Current (Amp):	0.07
Input Power (W):	8.21
Input Power Factor:	0.99
Current ATHD @ 120V(%):	6%
Current ATHD @ 277V(%):	N/A
Efficacy:	136
Color Rendering Index (CRI):	84
Correlated Color Temperature (K):	4995
Chromaticity Coordinate x:	0.3456
Chromaticity Coordinate y:	0.3558
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:30
Total Operating Time (Hours):	1:00

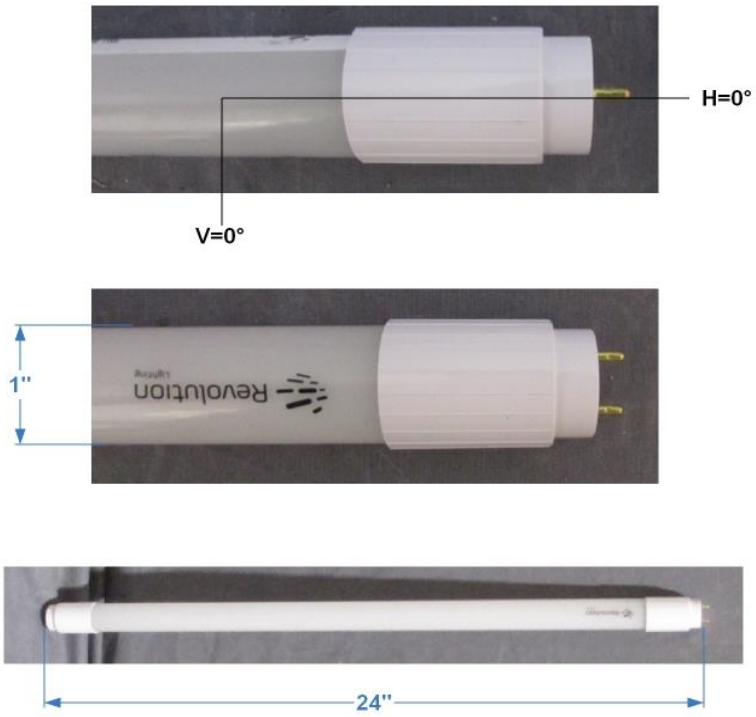

FIG. 1 LUMINAIRE

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

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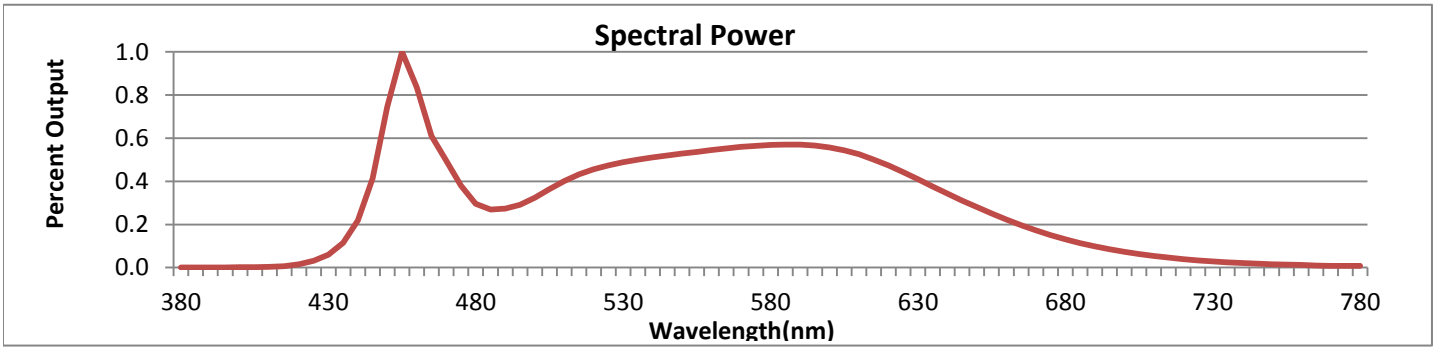


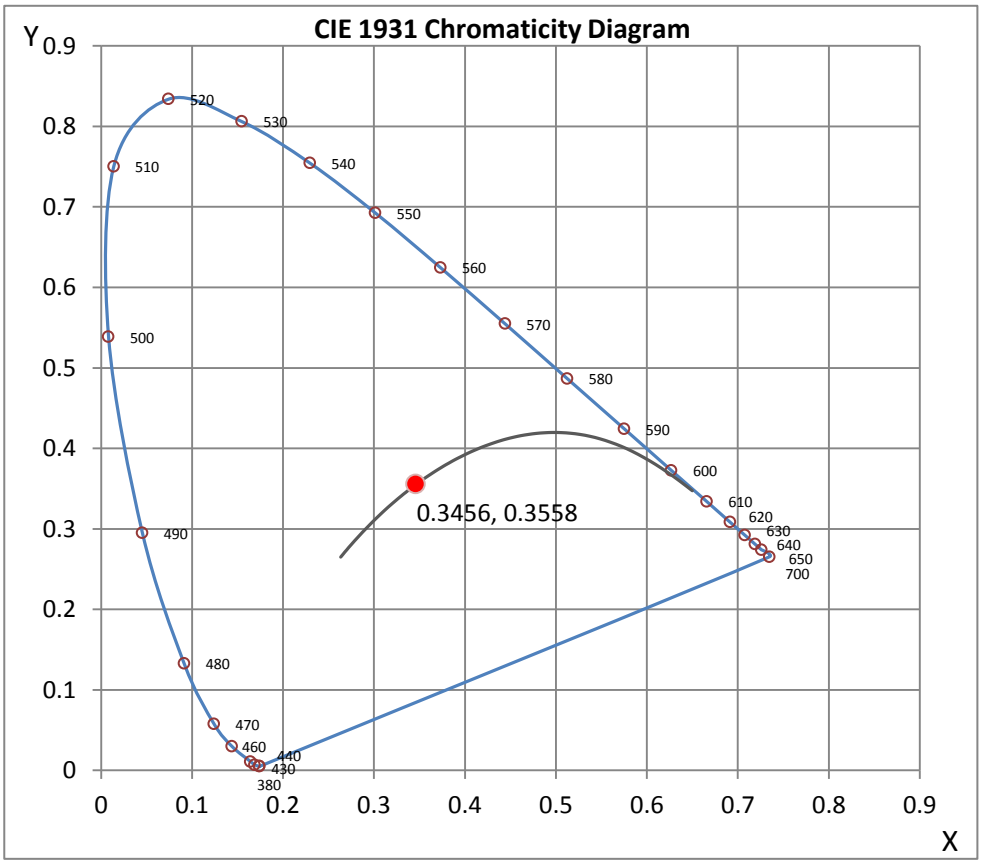
Wavelength	W/m²nm	440	0.2180	510	0.4009	580	0.5693	650	0.2805	720	0.0394
380	0.0007	450	0.7471	520	0.4563	590	0.5703	660	0.2230	730	0.0290
390	0.0009	460	0.8367	530	0.4892	600	0.5569	670	0.1726	740	0.0212
400	0.0013	470	0.4954	540	0.5105	610	0.5251	680	0.1309	750	0.0157
410	0.0032	480	0.2952	550	0.5286	620	0.4737	690	0.0982	760	0.0117
420	0.0153	490	0.2729	560	0.5449	630	0.4094	700	0.0727	770	0.0086
430	0.0601	500	0.3246	570	0.5595	640	0.3435	710	0.0536	780	0.0073

CRI & CCT

x	0.3456
y	0.3558
u'	0.2101
v'	0.4868
CRI	84.40
CCT	4995
Duv	0.00191

R Values

R1	83.60
R2	92.52
R3	95.26
R4	79.81
R5	81.81
R6	86.75
R7	86.60
R8	68.75
R9	17.71
R10	79.92
R11	78.65
R12	54.31
R13	86.71
R14	97.56



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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:

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 : L021702103.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L021702103
[TESTLAB] LIGHT LABORATORY, INC.
[ISSUEDATE] 2/14/2017
[MANUFAC] REVOLUTION LIGHTING TECHNOLOGIES
[LUMCAT] 202400-115
[LUMINAIRE] 2FT 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, 8.21W
[TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	1118
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	136
Total Luminaire Watts	8.21
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)	1.63 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	15281	12532	12900
55	14076	11776	12578
65	12360	11253	12443
75	9539	11047	12488
85	4589	11355	12977

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L021702103.IES

CANDELA TABULATION

	0.0	22.5	45.0	67.5	90.0
0	218.55	218.55	218.55	218.55	218.55
5	217.72	217.68	217.97	218.05	218.22
10	214.32	214.65	215.81	216.93	217.81
15	208.51	209.29	211.95	214.69	216.31
20	199.70	202.61	207.14	211.41	213.49
25	189.91	193.89	200.95	207.76	210.91
30	178.78	183.47	193.56	203.44	207.68
35	165.99	171.68	185.30	198.54	204.02
40	151.38	159.14	176.66	192.65	199.29
45	135.85	146.10	167.24	186.04	193.56
50	120.24	131.95	157.02	178.86	187.91
55	103.05	117.62	146.98	171.60	181.19
60	85.86	103.55	136.97	163.83	174.21
65	68.34	89.64	126.47	155.11	166.32
70	50.82	76.35	116.17	145.98	157.69
75	34.05	64.31	106.66	137.34	148.89
80	18.43	53.39	97.32	128.54	140.17
85	6.89	44.09	88.31	119.61	131.28
90	1.16	36.91	80.09	110.56	122.15
95	0.25	31.47	72.74	101.76	112.52
100	0.00	27.69	65.97	93.54	103.63
105	0.00	25.04	59.66	85.61	95.16
110	0.00	23.13	54.18	77.97	86.94
115	0.00	21.71	49.28	70.50	78.47
120	0.00	19.93	44.59	63.61	70.75
125	0.00	18.31	40.44	57.34	63.69
130	0.00	17.36	36.70	51.28	56.80
135	0.00	16.36	32.59	45.46	50.32
140	0.00	15.57	28.23	40.15	44.18
145	0.00	13.24	24.95	33.92	38.11
150	0.00	10.88	21.59	28.61	31.06
155	0.00	9.72	17.89	24.50	26.49
160	0.00	8.47	13.04	20.22	21.92
165	0.00	7.39	10.38	13.12	18.02
170	0.00	5.90	8.64	9.59	11.54
175	0.00	4.48	6.23	6.02	6.23
180	0.00	0.00	0.00	0.00	0.00

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L021702103.IES

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	80.65	N.A.	7.20
0-30	173.30	N.A.	15.50
0-40	289.29	N.A.	25.90
0-60	547.11	N.A.	48.90
0-80	774.01	N.A.	69.20
0-90	861.96	N.A.	77.10
10-90	841.22	N.A.	75.20
20-40	208.63	N.A.	18.70
20-50	336.91	N.A.	30.10
40-70	378.95	N.A.	33.90
60-80	226.91	N.A.	20.30
70-80	105.78	N.A.	9.50
80-90	87.95	N.A.	7.90
90-110	129.60	N.A.	11.60
90-120	174.55	N.A.	15.60
90-130	207.85	N.A.	18.60
90-150	245.50	N.A.	21.90
90-180	256.53	N.A.	22.90
110-180	126.93	N.A.	11.30
0-180	1118.49	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	20.74
10-20	59.92
20-30	92.64
30-40	115.99
40-50	128.28
50-60	129.54
60-70	121.12
70-80	105.78
80-90	87.95
90-100	71.81
100-110	57.79
110-120	44.94
120-130	33.31
130-140	23.24
140-150	14.40
150-160	7.59
160-170	2.94
170-180	0.50

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L021702103.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	108	108	108	108	98	98	98	89	89	89	81	81	81	77
1	100	94	89	84	95	90	85	80	81	77	74	73	70	67	66	64	61	58
2	90	80	73	66	85	77	69	63	69	63	58	62	58	54	56	52	49	46
3	81	70	61	53	77	66	58	51	60	53	48	54	49	44	49	44	40	37
4	74	61	52	44	70	58	50	43	53	46	40	48	42	37	43	38	34	31
5	68	54	45	38	64	52	43	36	47	40	34	43	36	31	38	33	29	26
6	62	48	39	32	59	46	38	31	42	35	29	38	32	27	35	29	25	23
7	58	44	35	28	54	42	33	27	38	31	26	35	29	24	32	26	22	20
8	54	40	31	25	51	38	30	24	35	28	23	32	26	21	29	24	20	18
9	50	36	28	22	47	35	27	22	32	25	20	29	23	19	27	21	18	16
10	47	33	25	20	44	32	24	19	29	23	18	27	21	17	25	20	16	14

IES INDOOR REPORT
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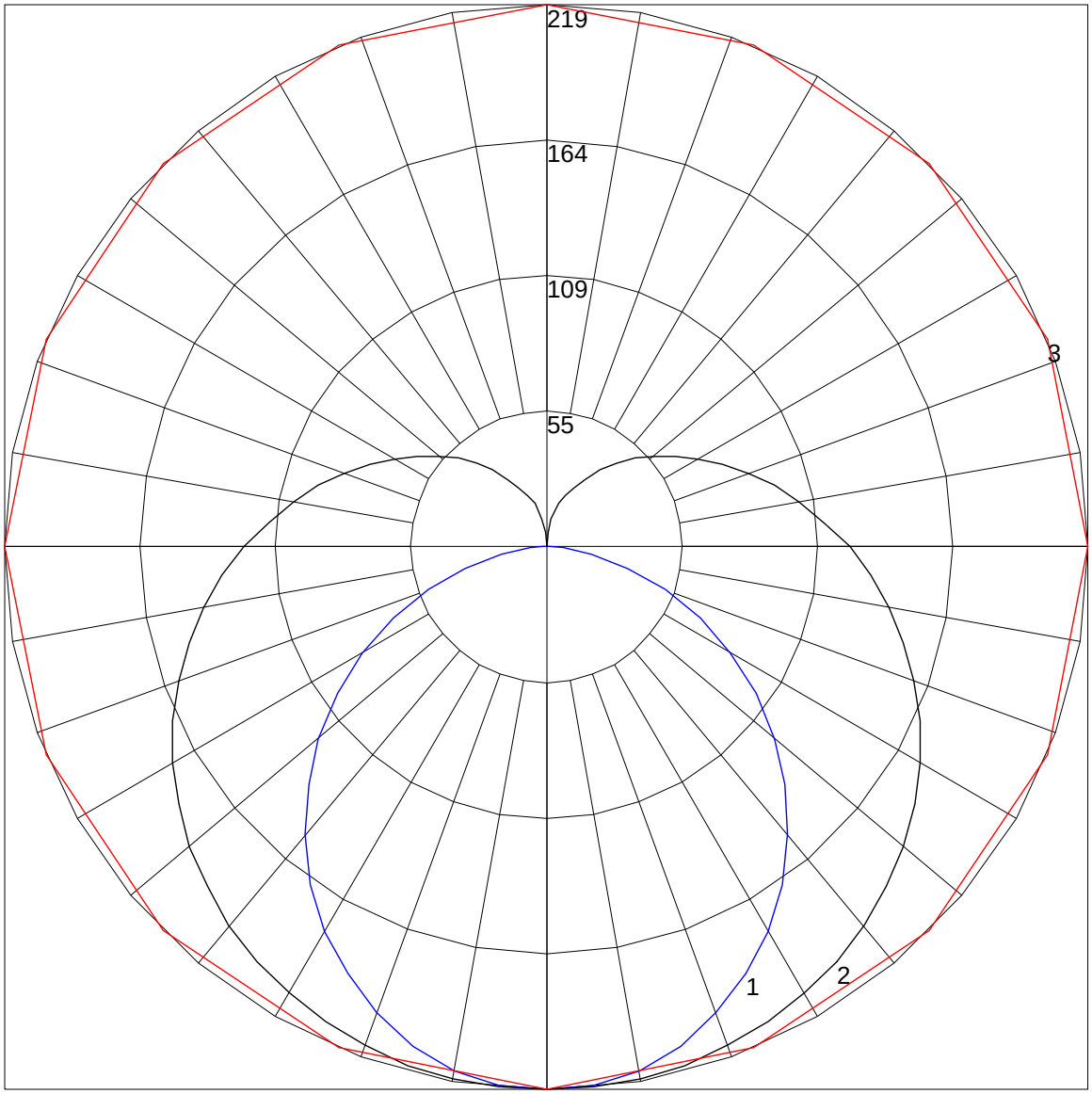
POLAR GRAPH



Maximum Candela = 218.55 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.)