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

NVLAP TESTING
NVLAP LAB CODE 200927-0

Report No: **L021702102** **Issue Date: 2/14/2017**

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

Model Number: **202400-113**

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:	202400-113
Driver Model Number:	N/A
Total Lumens:	1117.37
Input Voltage (VAC/60Hz):	120.00
Input Current (Amp):	0.07
Input Power (W):	8.32
Input Power Factor:	0.99
Current ATHD @ 120V(%):	6%
Current ATHD @ 277V(%):	N/A
Efficacy:	134
Color Rendering Index (CRI):	83
Correlated Color Temperature (K):	3952
Chromaticity Coordinate x:	0.3827
Chromaticity Coordinate y:	0.3784
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:30
Total Operating Time (Hours):	1:00

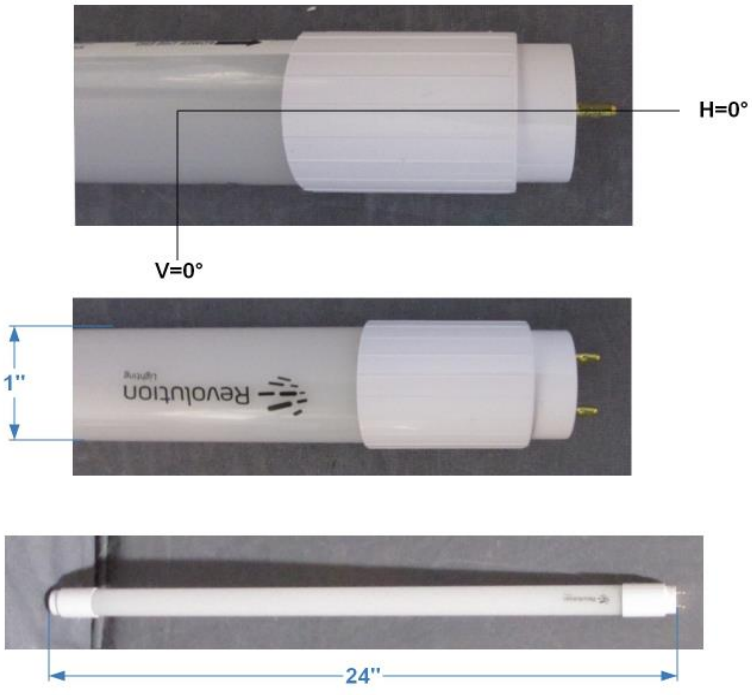

FIG. 1 LUMINAIRE

*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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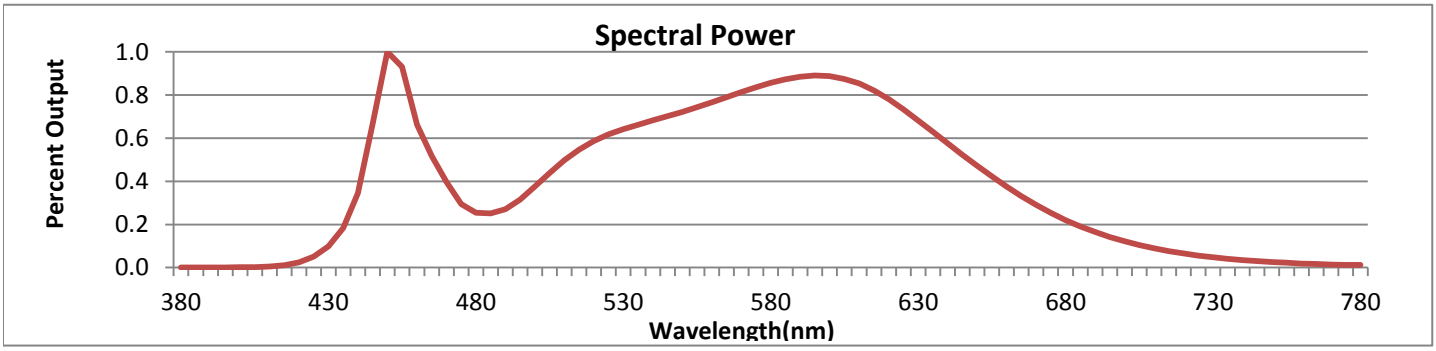


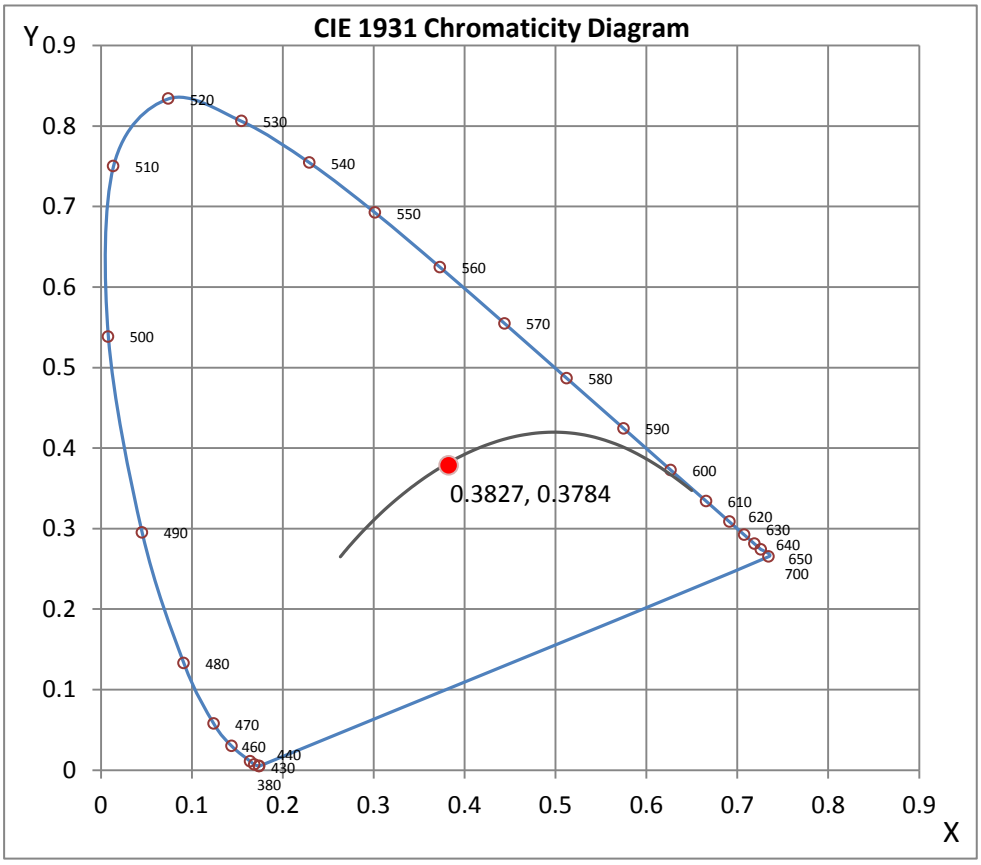
Wavelength	W/m²nm	440	0.3445	510	0.4971	580	0.8567	650	0.4717	720	0.0654
380	0.0009	450	1.0000	520	0.5867	590	0.8854	660	0.3759	730	0.0477
390	0.0011	460	0.6629	530	0.6420	600	0.8874	670	0.2908	740	0.0350
400	0.0017	470	0.3960	540	0.6824	610	0.8536	680	0.2207	750	0.0257
410	0.0047	480	0.2537	550	0.7218	620	0.7805	690	0.1648	760	0.0190
420	0.0245	490	0.2712	560	0.7656	630	0.6818	700	0.1220	770	0.0141
430	0.0982	500	0.3753	570	0.8138	640	0.5757	710	0.0893	780	0.0121

CRI & CCT

x	0.3827
y	0.3784
u'	0.2259
v'	0.5026
CRI	82.80
CCT	3952
Duv	0.00012

R Values

R1	81.47
R2	89.13
R3	94.07
R4	81.34
R5	80.70
R6	84.00
R7	86.38
R8	65.29
R9	10.96
R10	73.18
R11	79.57
R12	57.94
R13	83.43
R14	96.48



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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 : L021702102.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L021702102
[TESTLAB] LIGHT LABORATORY, INC.
[ISSUEDATE] 2/14/2017
[MANUFAC] REVOLUTION LIGHTING TECHNOLOGIES
[LUMCAT] 202400-113
[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, 8.32W
[TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	1117
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	134
Total Luminaire Watts	8.32
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	15253	12517	12905
55	14053	11765	12567
65	12329	11241	12412
75	9469	11031	12488
85	4535	11333	12944

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L021702102.IES

CANDELA TABULATION

	0.0	22.5	45.0	67.5	90.0
0	218.62	218.62	218.62	218.62	218.62
5	217.81	217.60	217.64	218.10	217.97
10	214.07	214.36	215.85	217.02	216.73
15	208.17	209.25	211.87	214.61	215.31
20	199.62	202.53	206.84	211.54	213.49
25	189.91	193.68	200.58	208.01	210.75
30	178.78	183.30	193.39	203.65	207.51
35	165.99	171.60	185.21	198.46	203.19
40	151.21	159.06	176.74	192.48	198.71
45	135.60	145.85	167.03	186.04	193.64
50	119.99	132.03	156.86	179.19	187.91
55	102.88	117.46	146.85	171.68	181.02
60	85.69	103.22	136.93	163.83	173.71
65	68.17	89.51	126.34	155.11	165.91
70	50.65	76.31	115.84	146.23	157.60
75	33.80	64.06	106.50	137.34	148.89
80	18.19	53.06	97.15	128.58	139.59
85	6.81	43.97	88.14	119.53	130.95
90	1.16	36.79	79.88	110.61	121.73
95	0.25	31.43	72.66	101.85	112.60
100	0.00	27.49	65.72	93.42	103.63
105	0.00	24.83	59.54	85.28	94.99
110	0.00	22.96	53.89	77.81	86.61
115	0.00	21.55	49.03	70.50	78.30
120	0.00	20.26	44.30	63.48	70.75
125	0.00	19.02	40.31	57.05	63.52
130	0.00	17.73	36.54	50.94	56.38
135	0.00	16.36	32.76	45.30	49.82
140	0.00	14.99	29.27	40.02	44.01
145	0.00	12.75	25.53	34.75	38.03
150	0.00	11.13	21.59	29.73	32.22
155	0.00	9.38	17.19	24.41	27.32
160	0.00	8.30	12.87	19.22	21.92
165	0.00	7.10	10.46	13.12	16.69
170	0.00	5.69	8.39	9.43	11.46
175	0.00	4.44	6.06	5.90	6.06
180	0.00	0.00	0.00	0.00	0.00

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L021702102.IES

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	80.59	N.A.	7.20
0-30	173.20	N.A.	15.50
0-40	289.10	N.A.	25.90
0-60	546.78	N.A.	48.90
0-80	773.41	N.A.	69.20
0-90	861.19	N.A.	77.10
10-90	840.46	N.A.	75.20
20-40	208.51	N.A.	18.70
20-50	336.72	N.A.	30.10
40-70	378.67	N.A.	33.90
60-80	226.63	N.A.	20.30
70-80	105.64	N.A.	9.50
80-90	87.77	N.A.	7.90
90-110	129.35	N.A.	11.60
90-120	174.17	N.A.	15.60
90-130	207.48	N.A.	18.60
90-150	245.24	N.A.	21.90
90-180	256.18	N.A.	22.90
110-180	126.84	N.A.	11.40
0-180	1117.37	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	20.72
10-20	59.87
20-30	92.60
30-40	115.91
40-50	128.21
50-60	129.47
60-70	121.00
70-80	105.64
80-90	87.77
90-100	71.74
100-110	57.60
110-120	44.83
120-130	33.31
130-140	23.21
140-150	14.55
150-160	7.57
160-170	2.87
170-180	0.49

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L021702102.IES

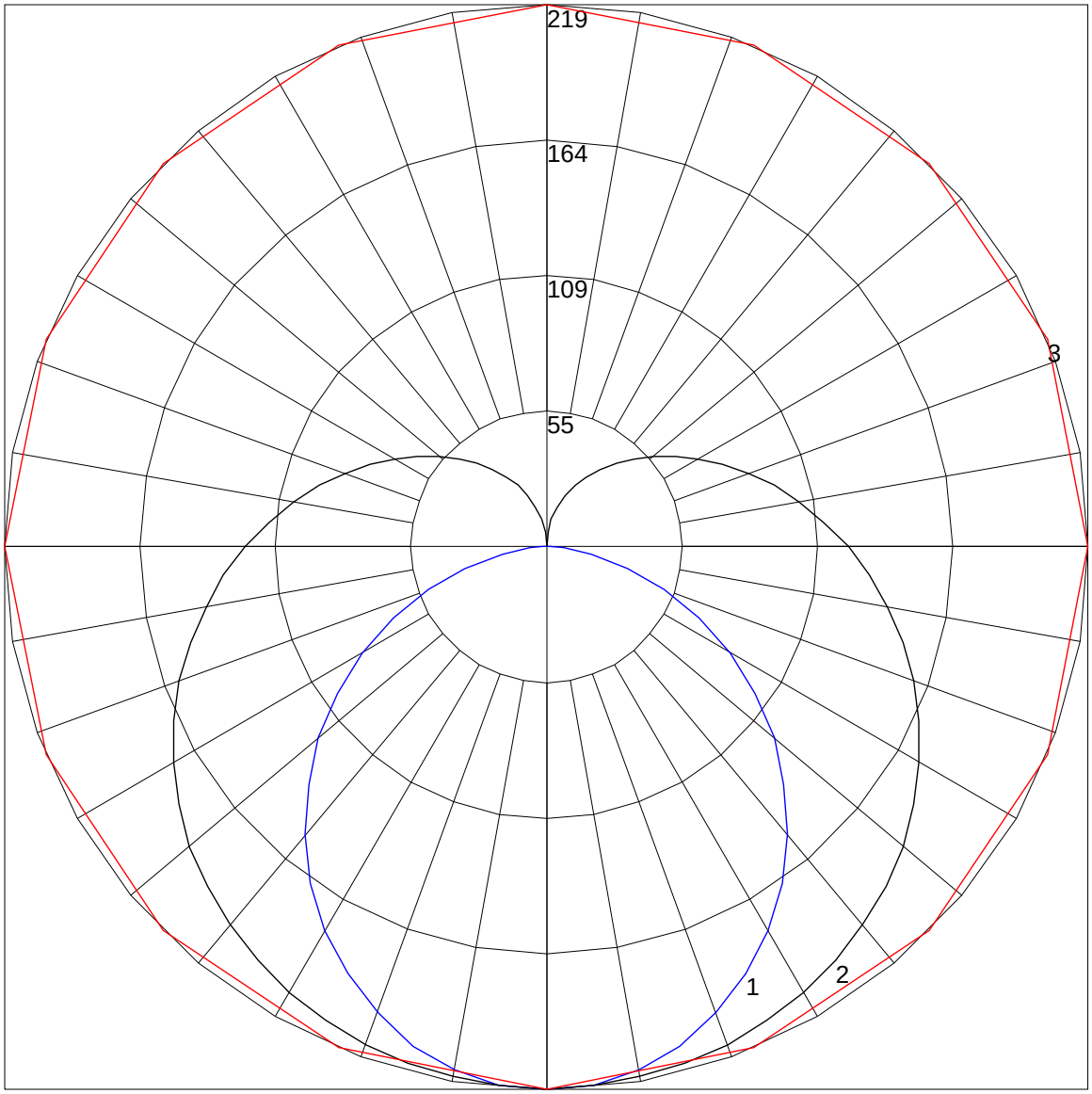
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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
PHOTOMETRIC FILENAME : L021702102.IES

POLAR GRAPH



Maximum Candela = 218.62 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.)