

Report No: L021702109

Issue Date: 2/15/2017

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

Model Number: 204403-115

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:	204403-115
Driver Model Number:	N/A
Total Lumens:	2331.40
Input Voltage (VAC/60Hz):	120.00
Input Current (Amp):	0.14
Input Power (W):	17.15
Input Power Factor:	0.99
Current ATHD @ 120V(%):	7%
Current ATHD @ 277V(%):	N/A
Efficacy:	136
Color Rendering Index (CRI):	85
Correlated Color Temperature (K):	5002
Chromaticity Coordinate x:	0.3455
Chromaticity Coordinate y:	0.3557
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:35
Total Operating Time (Hours):	1:05

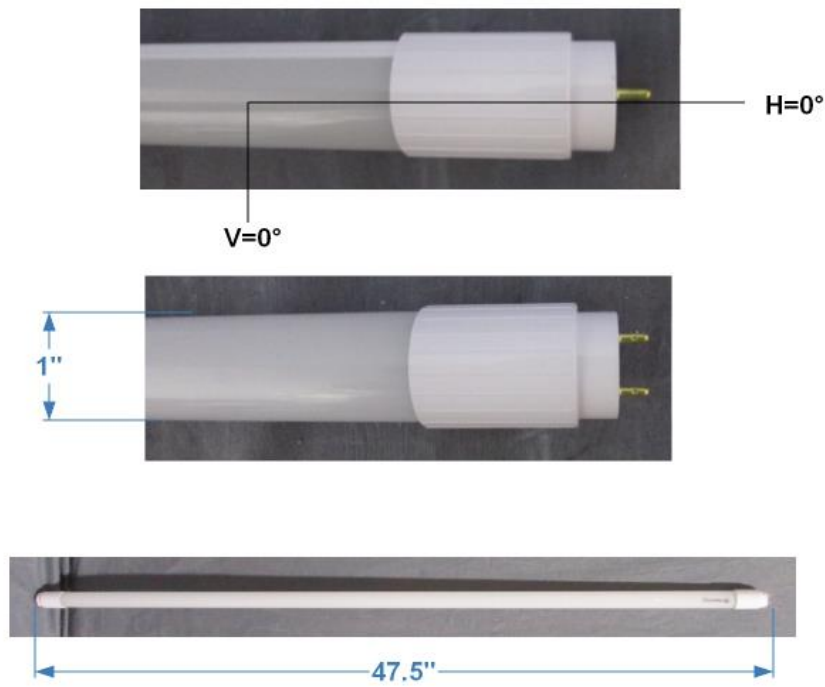
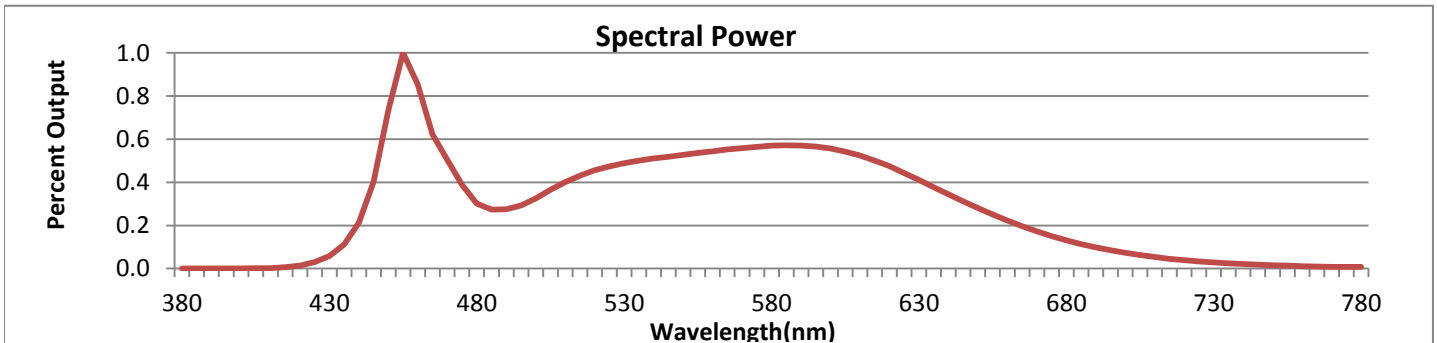


FIG. 1 LUMINAIRE

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



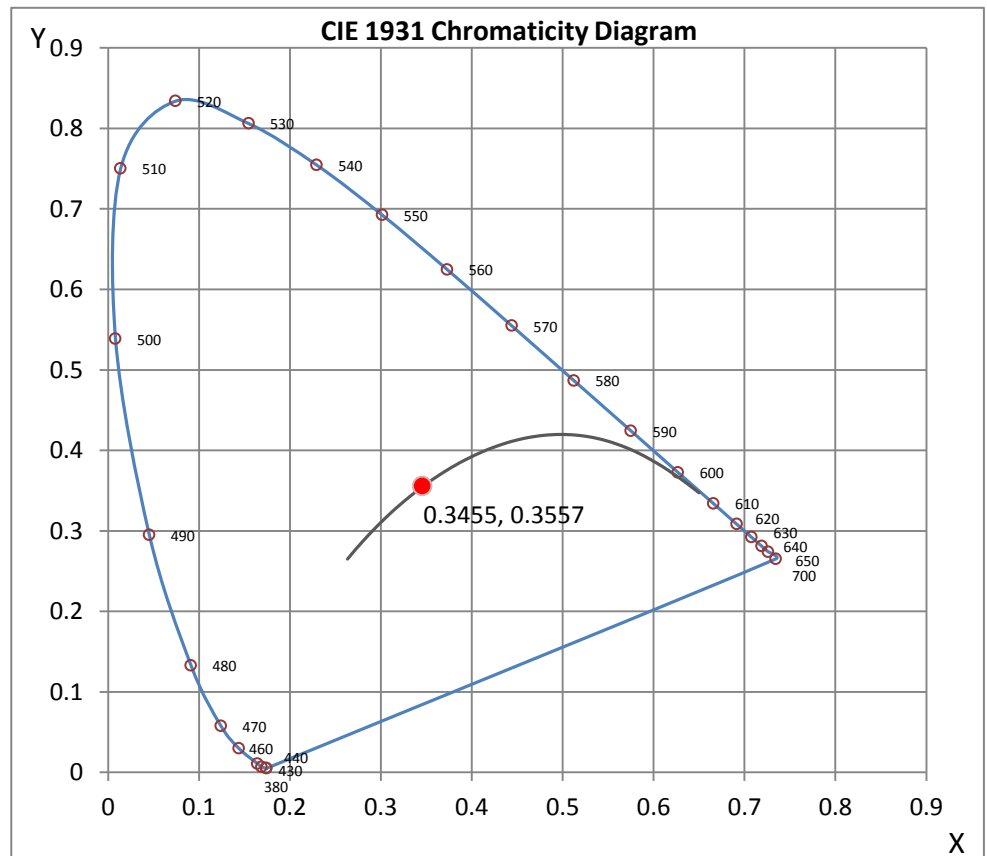
Wavelength	W/m ² nm	440	0.2124	510	0.4011	580	0.5697	650	0.2814	720	0.0392
380	0.0007	450	0.7336	520	0.4560	590	0.5707	660	0.2229	730	0.0287
390	0.0008	460	0.8535	530	0.4888	600	0.5565	670	0.1723	740	0.0210
400	0.0010	470	0.5048	540	0.5104	610	0.5244	680	0.1308	750	0.0156
410	0.0026	480	0.3012	550	0.5279	620	0.4746	690	0.0980	760	0.0115
420	0.0142	490	0.2757	560	0.5441	630	0.4115	700	0.0725	770	0.0085
430	0.0589	500	0.3260	570	0.5591	640	0.3453	710	0.0533	780	0.0073

CRI & CCT

x	0.3455
y	0.3557
u'	0.2101
v'	0.4867
CRI	84.80
CCT	5002
Duv	0.00190

R Values

R1	84.06
R2	92.71
R3	95.03
R4	81.36
R5	83.08
R6	87.40
R7	86.19
R8	68.34
R9	17.00
R10	80.63
R11	80.27
R12	60.35
R13	87.08
R14	97.67



*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 : L021702109.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L021702109
[TESTLAB] LIGHT LABORATORY, INC.
[ISSUEDATE] 2/15/2017
[MANUFAC] REVOLUTION LIGHTING TECHNOLOGIES
[LUMCAT] 204403-115
[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, 17.15W
[TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	2331
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	136
Total Luminaire Watts	17.15
Ballast Factor	1.00
CIE Type	Semi-Direct
Spacing Criterion (0-180)	1.24
Spacing Criterion (90-270)	1.44
Spacing Criterion (Diagonal)	1.48
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	14746	11722	11858
55	13732	11093	11539
65	12269	10643	11400
75	9735	10498	11536
85	4896	10885	11986

**IES INDOOR REPORT
PHOTOMETRIC FILENAME : L021702109.IES**

CANDELA TABULATION

	<u>0.0</u>	<u>22.5</u>	<u>45.0</u>	<u>67.5</u>	<u>90.0</u>
0	449.03	449.03	449.03	449.03	449.03
5	446.57	447.03	447.53	448.23	448.23
10	439.85	440.93	443.00	445.70	446.32
15	428.14	430.92	435.98	441.13	443.33
20	412.53	416.97	425.94	435.11	438.60
25	393.68	399.61	413.69	427.47	432.95
30	370.34	379.64	398.91	418.05	425.90
35	344.02	356.64	382.63	407.13	417.43
40	316.37	327.37	364.32	395.09	407.38
45	286.23	305.08	345.14	381.72	396.25
50	252.43	277.18	325.67	367.02	384.21
55	217.72	246.99	304.83	351.54	370.18
60	181.68	218.05	283.94	335.30	355.23
65	144.98	188.58	262.65	317.78	339.37
70	108.11	160.93	241.64	301.05	323.51
75	72.24	135.02	221.79	283.57	306.32
80	39.69	111.89	202.73	265.43	287.97
85	13.70	93.25	184.34	247.08	270.04
90	2.16	78.18	167.69	229.31	251.85
95	0.66	65.93	151.87	212.08	233.17
100	0.00	58.04	138.05	194.97	215.48
105	0.00	52.40	125.30	178.90	198.29
110	0.00	48.49	113.84	163.54	181.77
115	0.00	45.71	103.38	148.72	164.99
120	0.00	43.89	94.08	134.44	148.97
125	0.00	42.68	85.69	121.07	134.10
130	0.00	41.81	77.89	108.45	119.99
135	0.00	39.82	70.91	96.74	106.45
140	0.00	38.03	63.52	86.11	94.33
145	0.00	36.29	55.80	76.27	82.46
150	0.00	33.38	49.32	67.80	71.99
155	0.00	29.31	45.38	57.96	63.44
160	0.00	23.71	41.15	48.45	56.13
165	0.00	22.25	33.22	40.44	49.24
170	0.00	19.80	24.95	28.48	37.70
175	0.00	15.82	19.68	20.10	16.69
180	0.00	0.00	0.00	0.00	0.00

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L021702109.IES

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	165.76	N.A.	7.10
0-30	356.58	N.A.	15.30
0-40	595.63	N.A.	25.50
0-60	1128.89	N.A.	48.40
0-80	1599.31	N.A.	68.60
0-90	1781.97	N.A.	76.40
10-90	1739.39	N.A.	74.60
20-40	429.87	N.A.	18.40
20-50	694.94	N.A.	29.80
40-70	784.13	N.A.	33.60
60-80	470.42	N.A.	20.20
70-80	219.55	N.A.	9.40
80-90	182.66	N.A.	7.80
90-110	270.55	N.A.	11.60
90-120	365.20	N.A.	15.70
90-130	436.40	N.A.	18.70
90-150	520.18	N.A.	22.30
90-180	549.43	N.A.	23.60
110-180	278.89	N.A.	12.00
0-180	2331.4	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	42.58
10-20	123.18
20-30	190.82
30-40	239.05
40-50	265.06
50-60	268.19
60-70	250.87
70-80	219.55
80-90	182.66
90-100	149.68
100-110	120.87
110-120	94.65
120-130	71.20
130-140	50.66
140-150	33.12
150-160	19.12
160-170	8.55
170-180	1.59

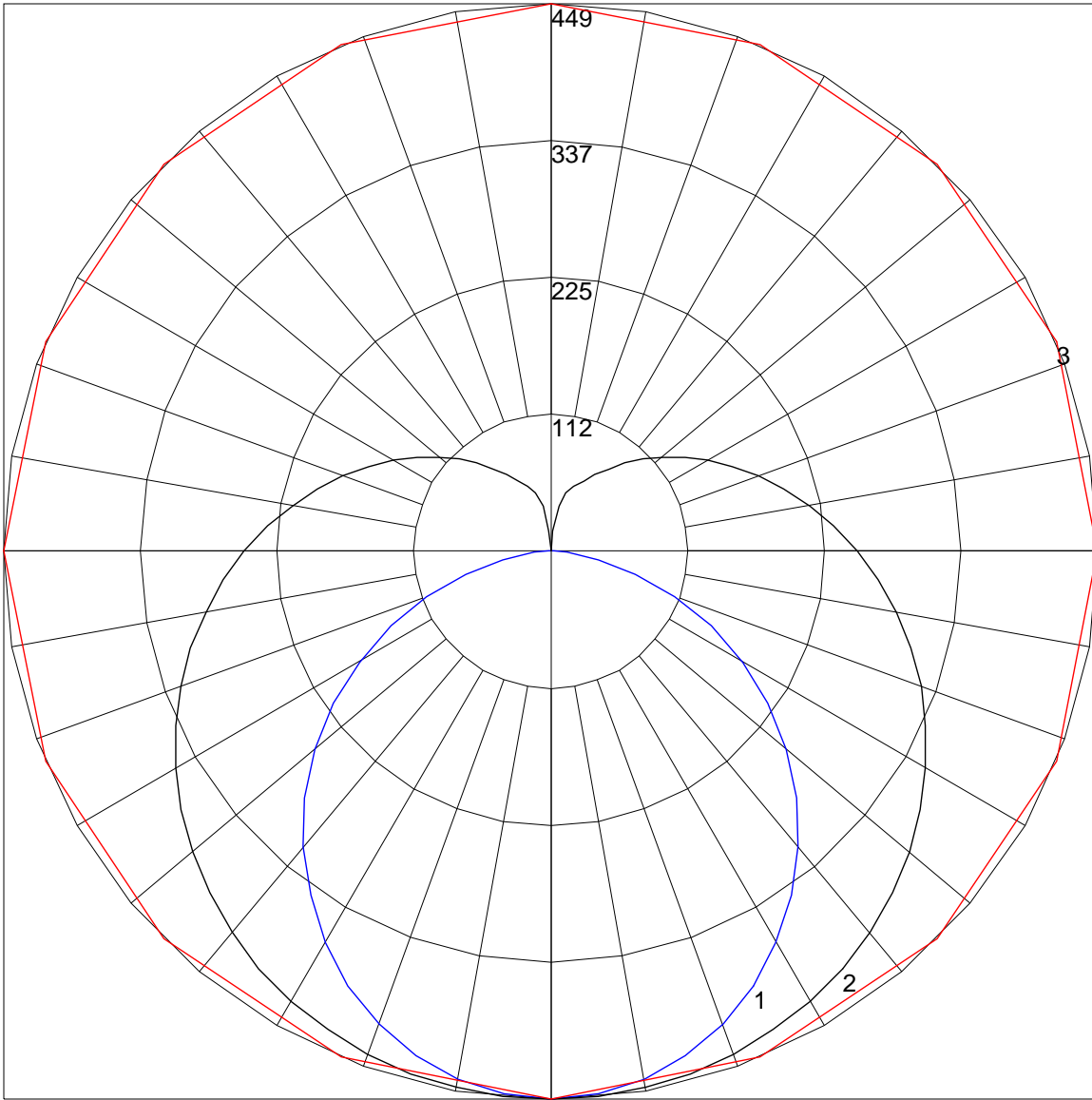
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COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	89	89	89	80	80	80	76
1	100	94	89	84	84	95	89	85	80	81	77	73	73	70	67	65	63	61	57
2	90	80	72	66	66	85	76	69	63	69	63	58	62	57	53	56	52	49	45
3	81	70	61	53	53	77	66	58	51	60	53	47	54	48	44	48	44	40	37
4	74	61	52	44	44	70	58	49	43	53	45	40	47	41	37	43	38	34	31
5	68	54	45	38	38	64	52	43	36	47	39	34	42	36	31	38	33	29	26
6	62	48	39	32	32	59	46	38	31	42	35	29	38	32	27	34	29	25	22
7	58	44	35	28	28	54	42	33	27	38	31	26	34	28	24	31	26	22	20
8	53	40	31	25	25	50	38	30	24	35	28	23	32	25	21	29	23	20	17
9	50	36	28	22	22	47	35	27	21	32	25	20	29	23	19	26	21	18	15
10	47	33	25	20	20	44	32	24	19	29	23	18	27	21	17	24	19	16	14

POLAR GRAPH



Maximum Candela = 449.03 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.)