



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

Report No: L051706707



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Issue Date: 5/22/2017

Report Prepared For: Revolution Lighting Technologies (RVLT)
2280 Ward Ave. Docks 5&6, Simi Valley, CA 93065

Model Number: 204221-012

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: GE 232MAXP-N/Ultra driver was connected to two led tubes from the driver output. Photometric measurements were measured from a single led tube while the other lamp was powered and covered with black velvet to prevent any light pollution. Input power of single measured module is calculated from the total power divided by two.

Sample Arrival Date: 5/19/17

Date of Tests: 5/20/17 - 5/22/17

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 (RVL)
Model Number:	204221-012
Driver Model Number:	GE 232MAXP-N/Ultra
Total Lumens:	1824.55
Input Voltage (VAC/60Hz):	120.00
Input Current (Amp):	0.13
Input Power (W):	15.59
Input Power Factor:	1.00
Current ATHD @ 120V(%):	7%
Current ATHD @ 277V(%):	N/A
Efficacy:	117
Color Rendering Index (CRI):	85
Correlated Color Temperature (K):	3502
Chromaticity Coordinate x:	0.4046
Chromaticity Coordinate y:	0.3891
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:35
Total Operating Time (Hours):	1:05

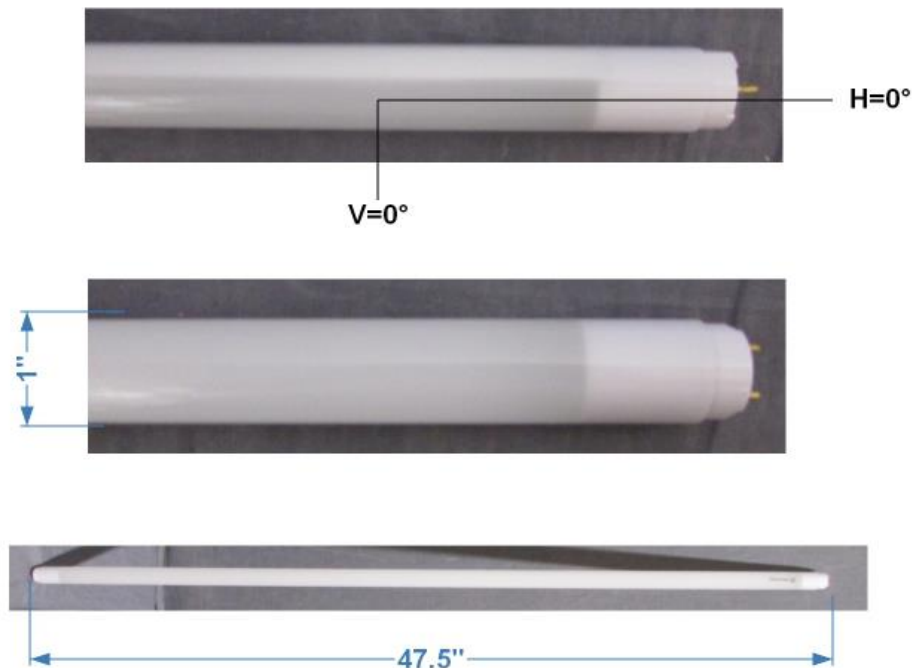
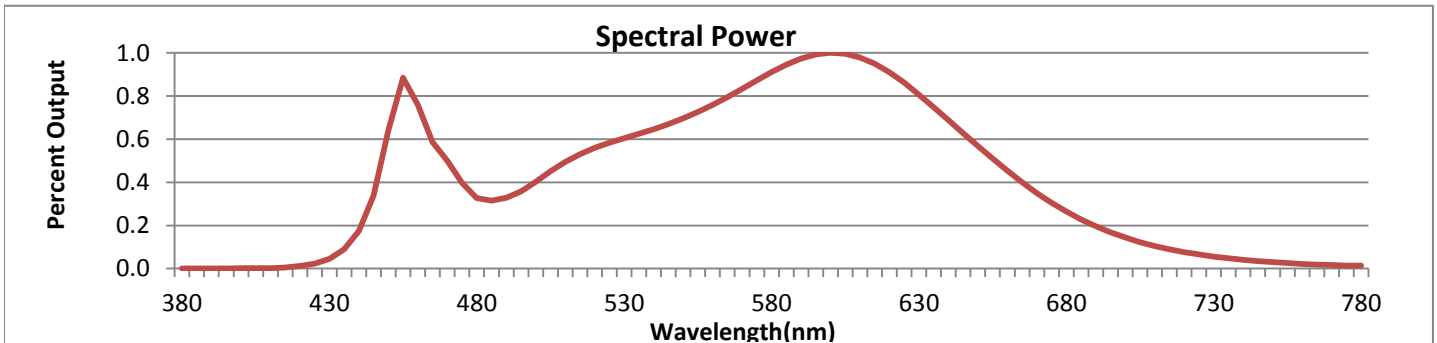


FIG. 1 LUMINAIRE

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



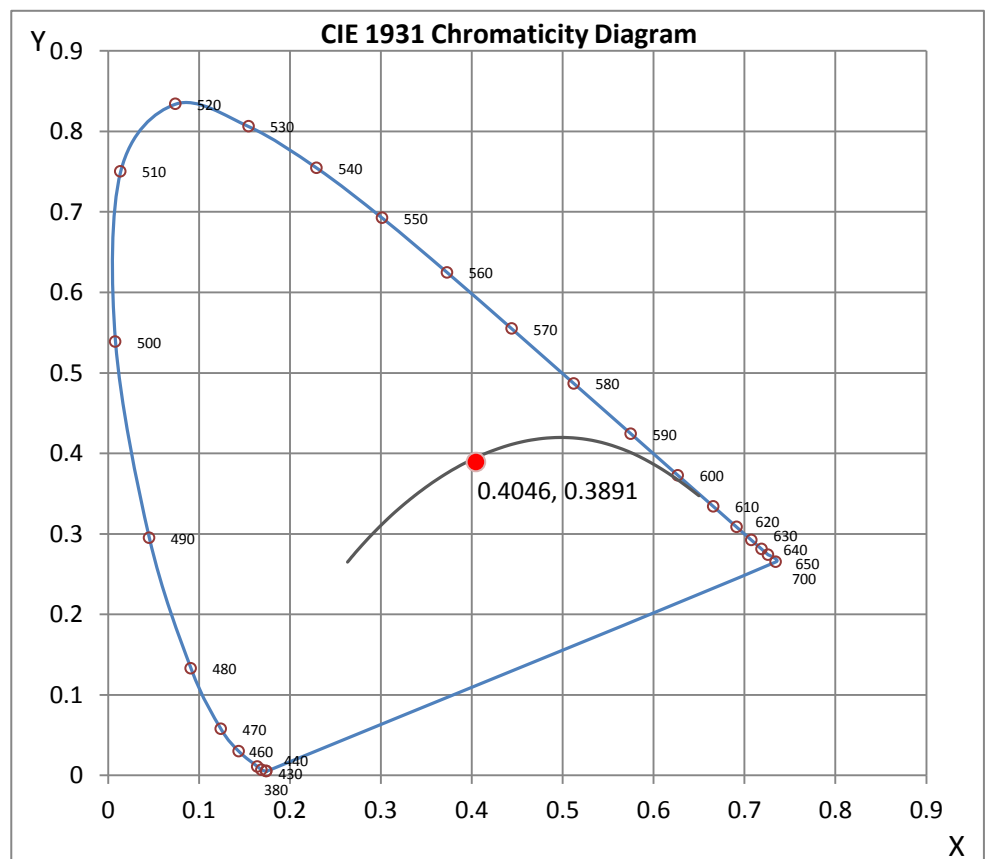
Wavelength	W/m ² nm	440	0.1741	510	0.4946	580	0.9115	650	0.5688	720	0.0763
380	0.0009	450	0.6398	520	0.5600	590	0.9738	660	0.4544	730	0.0554
390	0.0010	460	0.7601	530	0.6052	600	1.0000	670	0.3493	740	0.0405
400	0.0012	470	0.5006	540	0.6467	610	0.9791	680	0.2642	750	0.0298
410	0.0026	480	0.3275	550	0.6962	620	0.9108	690	0.1957	760	0.0218
420	0.0117	490	0.3289	560	0.7588	630	0.8063	700	0.1439	770	0.0162
430	0.0457	500	0.4024	570	0.8336	640	0.6887	710	0.1047	780	0.0140

CRI & CCT

x	0.4046
y	0.3891
u'	0.2359
v'	0.5105
CRI	85.00
CCT	3502
Duv	-0.00056

R Values

R1	84.68
R2	94.28
R3	95.23
R4	81.67
R5	84.14
R6	91.49
R7	83.84
R8	64.38
R9	18.06
R10	85.59
R11	81.16
R12	67.00
R13	87.58
R14	98.20



*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: 10*



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Photometric Test Report

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L051706707.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
 [TEST] L051706707
 [TESTLAB] LIGHT LABORATORY, INC. (www.lightlaboratory.com)
 [ISSUEDATE] 5/22/2017
 [MANUFAC] Revolution Lighting Technologies (RVLT)
 [LUMCAT] 204221-012
 [LUMINAIRE] 14W G2 Uni-Fit Ballast-Ready Tube Lamp 3500K
 [BALLASTCAT] GE 232MAXP-N/Ultra
 [OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND
 [MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.
 [_TEST CONDITION] GE 232MAXP-N/Ultra DRIVER WAS CONNECTED
 [MORE] TO TWO LED TUBES FROM THE DRIVER OUTPUT.
 [MORE] PHOTOMETRIC MEASUREMENTS WERE MEASURED FROM
 [MORE] A SINGLE LED TUBE WHILE THE OTHER LAMP WAS POWERED
 [MORE] AND COVERED WITH BLACK VELVET TO PREVENT ANY LIGHT POLLUTION.
 [MORE] INPUT POWER OF SINGLE MEASURED MODULE IS CALCULATED
 [MORE] FROM THE TOTAL POWER DIVIDED BY TWO.
 [INPUT] 120VAC, 15.59W
 [TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	1825
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	117
Total Luminaire Watts	15.59
Ballast Factor	1.00
CIE Type	Semi-Direct
Spacing Criterion (0-180)	1.22
Spacing Criterion (90-270)	1.38
Spacing Criterion (Diagonal)	1.46
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)

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L051706707.IES

LUMINANCE DATA (cd/sq.m)

Angle In Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	766258	15363	12272
55	499677	13084	11123
65	298542	10822	9787
75	138297	8691	8410
85	23709	6809	7053

**IES INDOOR REPORT
PHOTOMETRIC FILENAME : L051706707.IES**

CANDELA TABULATION

	<u>0.0</u>	<u>22.5</u>	<u>45.0</u>	<u>67.5</u>	<u>90.0</u>
0	408.33	408.33	408.33	408.33	408.33
5	405.97	406.42	406.80	407.25	407.05
10	399.41	400.36	402.23	404.18	404.56
15	388.45	390.27	394.63	398.87	400.32
20	373.00	376.61	384.21	391.44	394.18
25	354.48	360.09	371.51	382.05	386.12
30	333.72	339.95	355.98	370.39	375.82
35	309.15	319.03	336.09	357.10	364.37
40	282.08	295.20	320.19	342.03	351.00
45	253.26	269.37	300.18	326.79	335.05
50	222.95	242.14	278.46	309.52	320.85
55	191.32	214.19	256.13	290.79	303.67
60	159.10	187.33	234.00	271.82	286.14
65	126.47	159.51	212.16	252.60	267.21
70	93.83	132.98	190.86	233.29	247.95
75	62.44	108.99	170.56	214.19	229.60
80	33.80	87.36	151.46	195.43	211.16
85	11.04	68.84	133.69	177.78	192.56
90	0.58	54.51	118.08	160.80	175.04
95	0.50	43.68	103.38	144.36	158.43
100	0.00	35.75	90.43	129.00	142.57
105	0.00	30.39	80.88	115.38	127.63
110	0.00	26.57	69.88	102.34	113.59
115	0.00	23.83	61.20	90.30	100.72
120	0.00	21.80	53.64	80.30	88.85
125	0.00	20.30	47.33	69.96	78.80
130	0.00	18.97	41.68	60.78	68.01
135	0.00	17.56	36.62	52.56	58.87
140	0.00	16.48	31.76	45.42	50.49
145	0.00	15.36	26.78	38.86	43.01
150	0.00	13.91	22.96	33.05	36.45
155	0.00	12.54	20.14	27.11	30.47
160	0.00	10.63	17.65	21.55	25.08
165	0.00	9.63	14.28	17.15	21.17
170	0.00	8.68	11.04	12.71	15.20
175	0.00	6.85	8.47	8.84	8.30
180	0.00	0.00	0.00	0.00	0.00

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L051706707.IES

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	150.10	N.A.	8.20
0-30	321.19	N.A.	17.60
0-40	532.57	N.A.	29.20
0-60	988.40	N.A.	54.20
0-80	1361.43	N.A.	74.60
0-90	1493.84	N.A.	81.90
10-90	1455.15	N.A.	79.80
20-40	382.47	N.A.	21.00
20-50	612.36	N.A.	33.60
40-70	659.44	N.A.	36.10
60-80	373.04	N.A.	20.40
70-80	169.42	N.A.	9.30
80-90	132.40	N.A.	7.30
90-110	178.54	N.A.	9.80
90-120	234.89	N.A.	12.90
90-130	274.75	N.A.	15.10
90-150	317.55	N.A.	17.40
90-180	330.72	N.A.	18.10
110-180	152.17	N.A.	8.30
0-180	1824.55	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

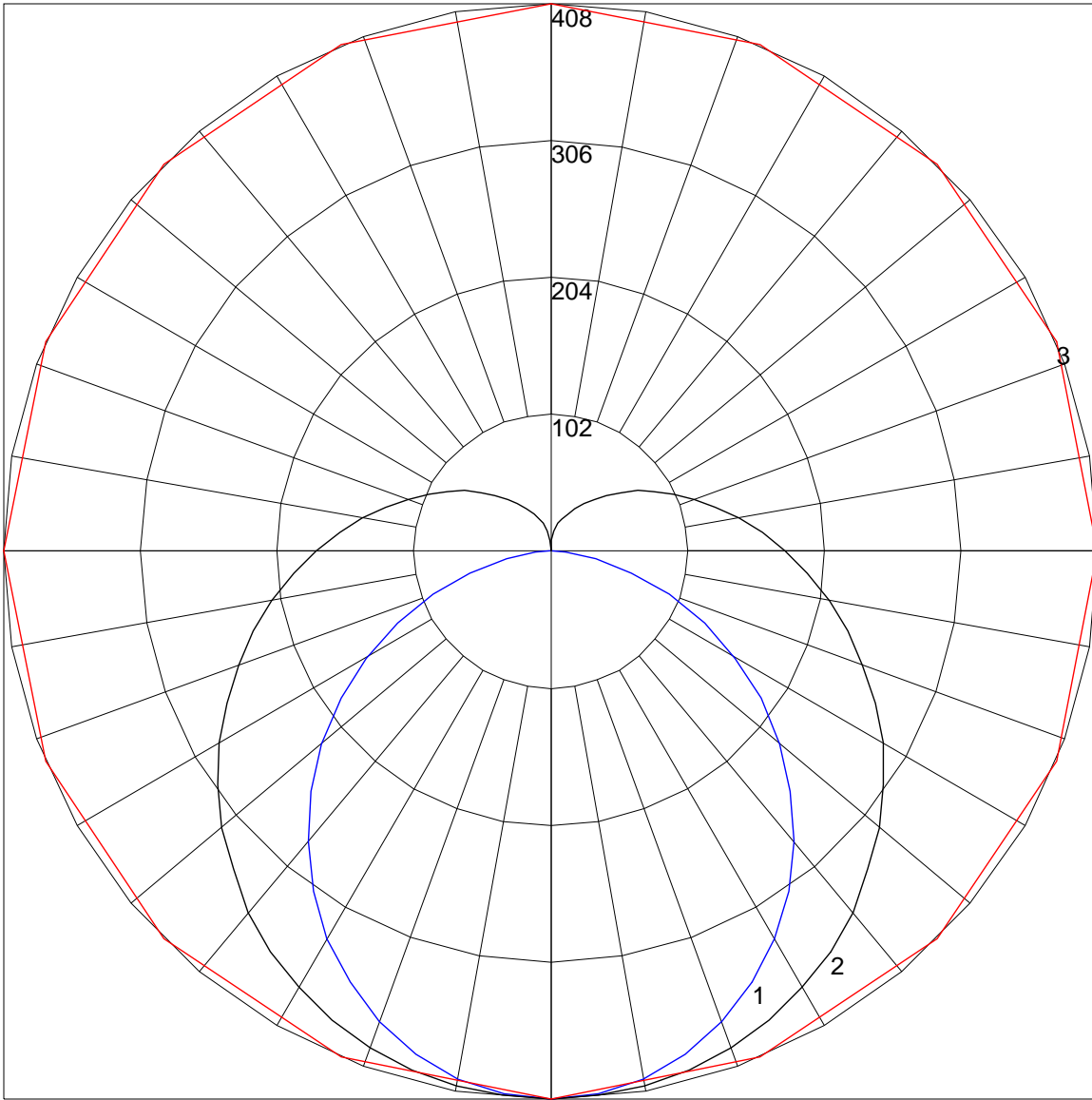
Zone	Lumens
0-10	38.68
10-20	111.42
20-30	171.09
30-40	211.38
40-50	229.89
50-60	225.93
60-70	203.62
70-80	169.42
80-90	132.40
90-100	101.59
100-110	76.95
110-120	56.35
120-130	39.86
130-140	26.54
140-150	16.25
150-160	8.76
160-170	3.71
170-180	0.70

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	115	115	115	115	115	110	110	110	110	101	101	101	93	93	93	85	85	85	82
1	102	96	90	86	86	97	92	87	83	84	80	77	77	74	71	70	68	66	62
2	91	82	74	68	68	87	78	71	65	72	66	61	66	61	57	60	56	53	50
3	83	71	62	55	55	79	68	60	53	63	56	50	57	52	47	52	48	44	41
4	75	63	53	46	46	72	60	51	45	55	48	42	51	45	40	46	41	37	34
5	69	56	46	39	39	66	53	45	38	49	42	36	45	39	34	42	36	32	29
6	64	50	40	34	34	60	48	39	33	44	37	31	41	34	29	38	32	28	25
7	59	45	36	30	30	56	43	35	29	40	33	27	37	31	26	34	29	25	22
8	55	41	32	26	26	52	39	31	25	36	29	24	34	28	23	31	26	22	20
9	51	37	29	23	23	49	36	28	23	33	27	22	31	25	21	29	24	20	18
10	48	34	26	21	21	46	33	26	20	31	24	20	29	23	19	27	22	18	16

POLAR GRAPH



Maximum Candela = 408.33 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.)