



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

Report No: L051706708



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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: 204221-013

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:	204221-013
Driver Model Number:	GE 232MAXP-N/Ultra
Total Lumens:	1971.18
Input Voltage (VAC/60Hz):	120.00
Input Current (Amp):	0.13
Input Power (W):	15.61
Input Power Factor:	1.00
Current ATHD @ 120V(%):	7%
Current ATHD @ 277V(%):	N/A
Efficacy:	126
Color Rendering Index (CRI):	83
Correlated Color Temperature (K):	3944
Chromaticity Coordinate x:	0.3842
Chromaticity Coordinate y:	0.3828
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:30
Total Operating Time (Hours):	1:00

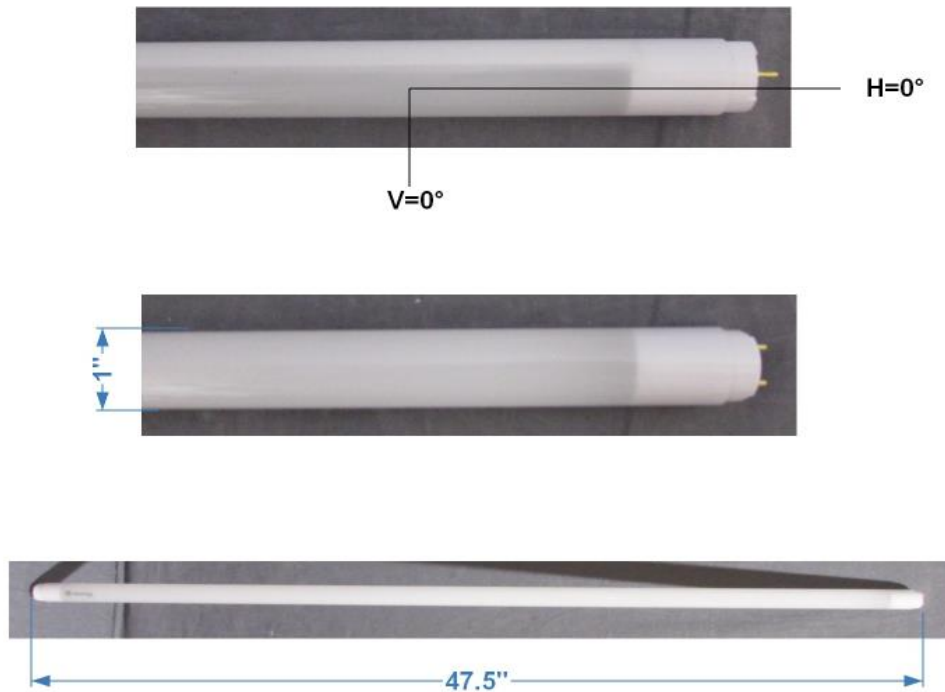
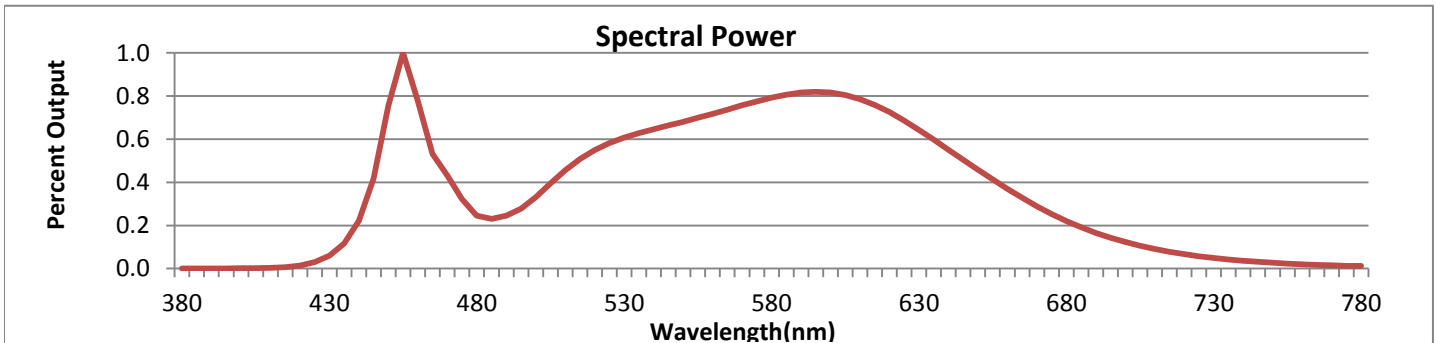


FIG. 1 LUMINAIRE

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



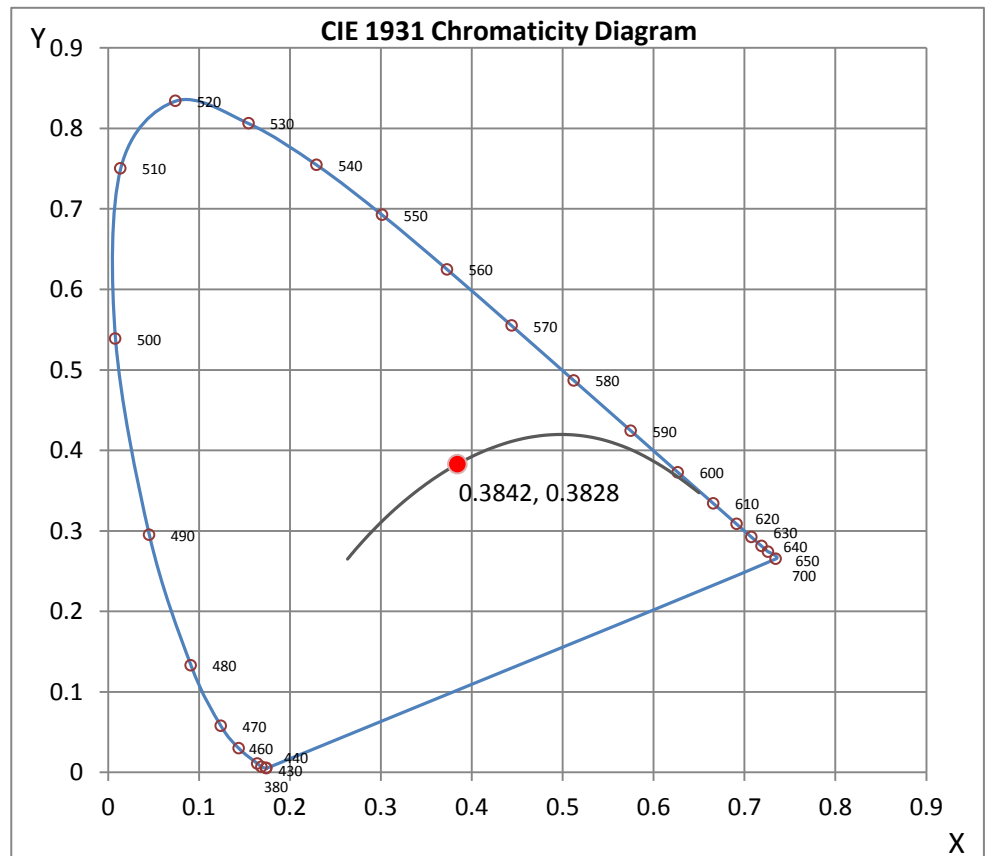
Wavelength	W/m ² nm	440	0.2220	510	0.4560	580	0.7929	650	0.4587	720	0.0672
380	0.0009	450	0.7545	520	0.5496	590	0.8168	660	0.3704	730	0.0494
390	0.0009	460	0.7788	530	0.6076	600	0.8160	670	0.2882	740	0.0363
400	0.0013	470	0.4317	540	0.6462	610	0.7858	680	0.2204	750	0.0269
410	0.0031	480	0.2448	550	0.6804	620	0.7261	690	0.1658	760	0.0202
420	0.0145	490	0.2458	560	0.7171	630	0.6428	700	0.1233	770	0.0150
430	0.0602	500	0.3310	570	0.7567	640	0.5515	710	0.0911	780	0.0130

CRI & CCT

x	0.3842
y	0.3828
u'	0.2252
v'	0.5048
CRI	83.10
CCT	3944
Duv	0.00173

R Values

R1	81.72
R2	89.66
R3	94.53
R4	80.57
R5	80.29
R6	84.35
R7	87.01
R8	66.36
R9	14.35
R10	73.93
R11	78.41
R12	54.63
R13	83.86
R14	96.71



*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 : L051706708.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
 [TEST] L051706708
 [TESTLAB] LIGHT LABORATORY, INC. (www.lightlaboratory.com)
 [ISSUE DATE] 5/22/2017
 [MANUFAC] Revolution Lighting Technologies (RVLT)
 [LUMCAT] 204221-013
 [LUMINAIRE] 14W G2 Uni-Fit Ballast-Ready Tube Lamp 4000K
 [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, 15.61W
 [TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	1971
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	126
Total Luminaire Watts	15.61
Ballast Factor	1.00
CIE Type	Semi-Direct
Spacing Criterion (0-180)	1.22
Spacing Criterion (90-270)	1.38
Spacing Criterion (Diagonal)	1.44
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 : L051706708.IES

LUMINANCE DATA (cd/sq.m)

Angle In Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	832095	16612	13328
55	538696	14125	11986
65	320684	11624	10508
75	158364	9323	9003
85	24611	7287	7528

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L051706708.IES

CANDELA TABULATION

	<u>0.0</u>	<u>22.5</u>	<u>45.0</u>	<u>67.5</u>	<u>90.0</u>
0	446.16	446.16	446.16	446.16	446.16
5	443.67	444.16	444.41	444.70	444.66
10	436.36	437.31	439.22	441.09	441.76
15	423.74	426.23	430.71	434.78	436.61
20	406.96	410.78	418.80	426.44	429.22
25	386.70	391.81	404.10	415.81	420.25
30	361.79	369.80	386.74	402.48	408.96
35	335.55	345.18	367.44	387.33	395.75
40	305.91	319.57	344.73	370.63	380.14
45	275.02	291.17	324.59	352.33	363.87
50	240.81	261.48	300.72	332.56	343.19
55	206.26	230.97	276.51	313.13	327.25
60	171.14	201.24	252.10	292.17	307.40
65	135.85	171.26	227.89	270.87	286.89
70	100.72	142.62	204.48	249.82	266.30
75	71.50	116.83	182.97	229.06	245.79
80	36.12	93.21	162.30	208.92	225.03
85	11.46	73.78	143.07	189.32	205.52
90	1.00	58.58	125.97	171.35	187.33
95	0.66	46.87	110.56	154.32	168.98
100	0.00	38.82	97.11	138.01	152.37
105	0.00	33.30	85.49	123.43	136.76
110	0.00	29.35	75.40	110.11	122.56
115	0.00	26.45	66.39	97.57	108.53
120	0.00	24.45	58.75	85.86	95.99
125	0.00	22.92	52.02	75.94	84.45
130	0.00	21.59	45.63	66.55	74.07
135	0.00	20.14	40.73	58.00	64.52
140	0.00	18.77	35.25	50.32	55.72
145	0.00	17.56	30.27	42.97	47.75
150	0.00	16.07	26.12	37.12	40.52
155	0.00	14.45	23.04	30.27	34.05
160	0.00	12.58	19.89	24.29	28.48
165	0.00	11.17	16.44	19.51	23.75
170	0.00	10.01	13.04	14.78	17.36
175	0.00	7.81	9.88	10.34	9.63
180	0.00	0.00	0.00	0.00	0.00

IES INDOOR REPORT
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ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	163.81	N.A.	8.30
0-30	350.02	N.A.	17.80
0-40	579.43	N.A.	29.40
0-60	1071.17	N.A.	54.30
0-80	1471.5	N.A.	74.70
0-90	1612.92	N.A.	81.80
10-90	1570.66	N.A.	79.70
20-40	415.63	N.A.	21.10
20-50	664.00	N.A.	33.70
40-70	710.35	N.A.	36.00
60-80	400.33	N.A.	20.30
70-80	181.71	N.A.	9.20
80-90	141.42	N.A.	7.20
90-110	191.22	N.A.	9.70
90-120	252.25	N.A.	12.80
90-130	295.73	N.A.	15.00
90-150	343.29	N.A.	17.40
90-180	358.26	N.A.	18.20
110-180	167.04	N.A.	8.50
0-180	1971.18	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

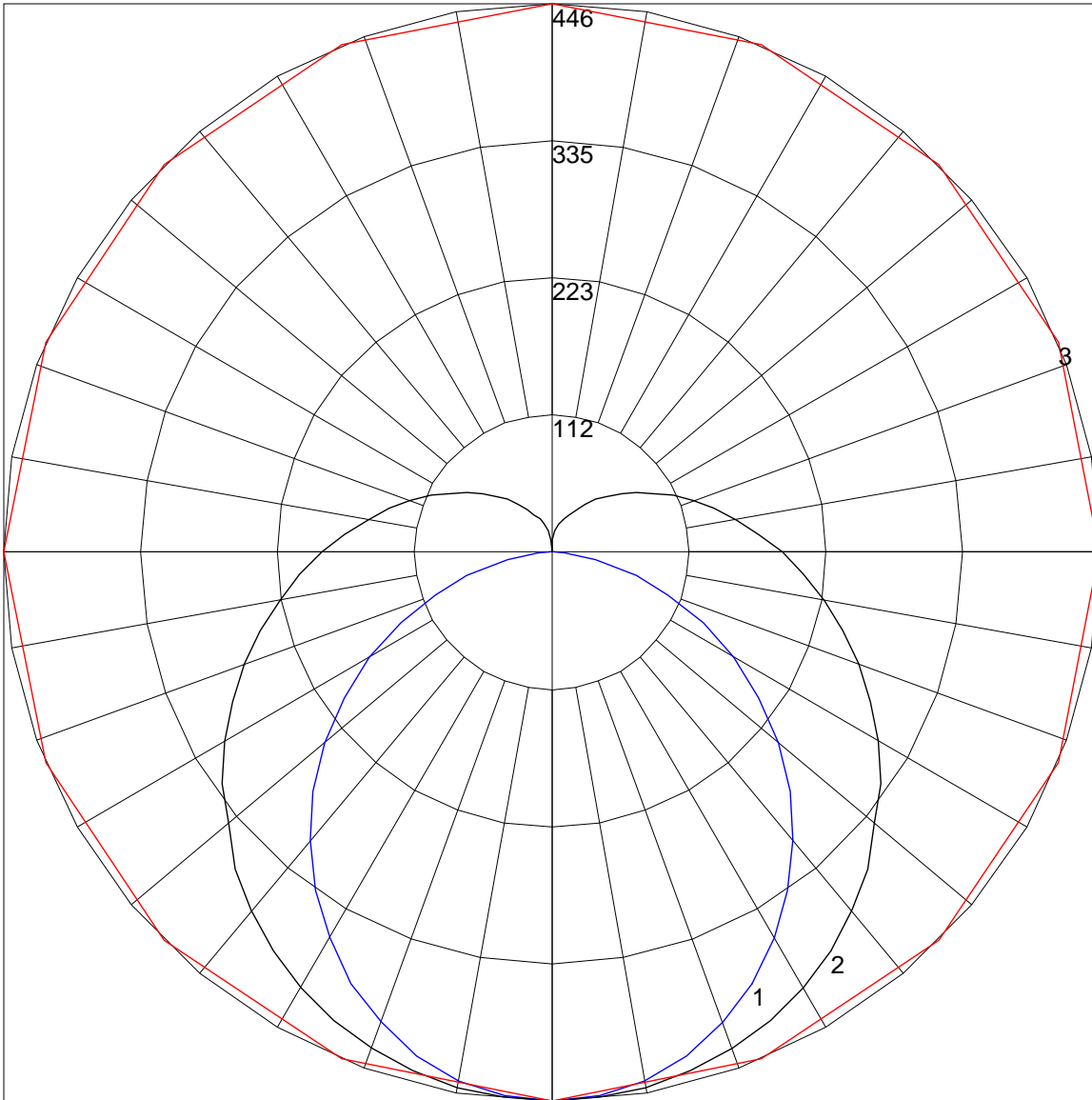
Zone	Lumens
0-10	42.25
10-20	121.56
20-30	186.21
30-40	229.42
40-50	248.38
50-60	243.36
60-70	218.61
70-80	181.71
80-90	141.42
90-100	108.68
100-110	82.54
110-120	61.03
120-130	43.48
130-140	29.38
140-150	18.18
150-160	9.92
160-170	4.24
170-180	0.81

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	110	110	110	110	101	101	101	93	93	93	85	85	85	82
1	102	96	91	86	97	92	87	83	84	80	77	77	74	71	71	68	66	62
2	92	82	74	68	87	79	72	66	72	66	61	66	61	57	60	57	53	50
3	83	71	62	55	79	68	60	54	63	56	50	57	52	47	53	48	44	41
4	76	63	53	46	72	60	51	45	55	48	42	51	45	40	47	41	37	34
5	69	56	46	39	66	53	45	38	49	42	36	45	39	34	42	36	32	29
6	64	50	41	34	61	48	39	33	44	37	31	41	34	30	38	32	28	25
7	59	45	36	30	56	43	35	29	40	33	27	37	31	26	34	29	25	22
8	55	41	32	26	52	39	31	26	37	29	24	34	28	23	31	26	22	20
9	51	37	29	23	49	36	28	23	34	27	22	31	25	21	29	24	20	18
10	48	34	26	21	46	33	26	21	31	24	20	29	23	19	27	22	18	16

POLAR GRAPH



Maximum Candela = 446.16 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.)