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www.lightlaboratory.com

Report No: L121605937R02



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Issue Date: 2/17/2017

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

Model Number: 204481-113

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: SL 28X2 -I580 120-277W D1 M DRIVER was connected to two led tubes from the driver output. Photometric measurements were measured from a single led tube while the other tube 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: 12/21/16

Date of Tests: 1/9/17 - 1/9/17

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
Model Number:	204481-113
Driver Model Number:	SL 28X2 -I580 120-277W D1 M
Total Lumens:	3511.53
Input Voltage (VAC/60Hz):	120.00
Input Current (Amp):	0.24
Input Power (W):	28.19
Input Power Factor:	1.00
Current ATHD @ 120V(%):	5%
Current ATHD @ 277V(%):	N/A
Efficacy:	125
Color Rendering Index (CRI):	84
Correlated Color Temperature (K):	3898
Chromaticity Coordinate x:	0.3869
Chromaticity Coordinate y:	0.3860
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	1:30
Total Operating Time (Hours):	2:05
Off State Power(W):	0.00

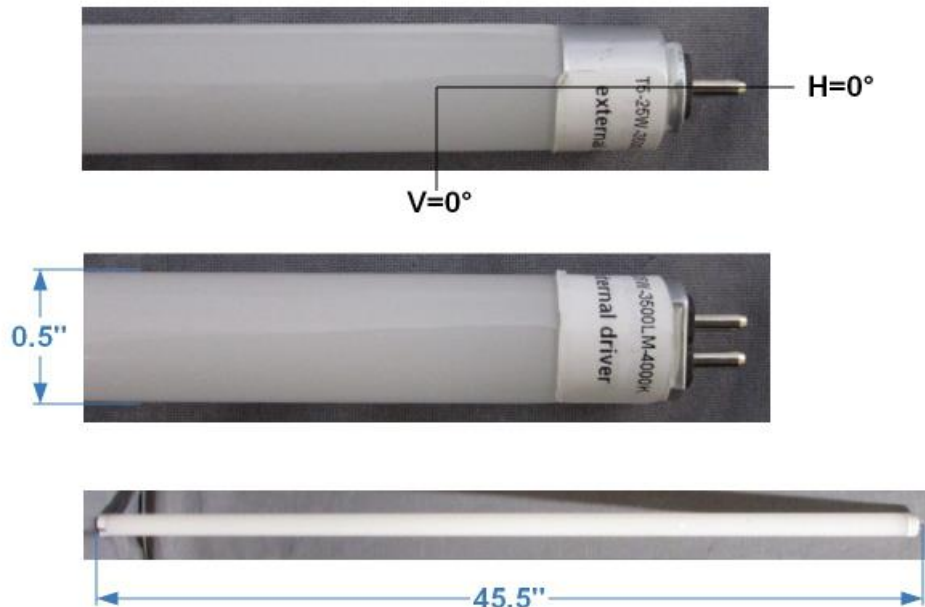
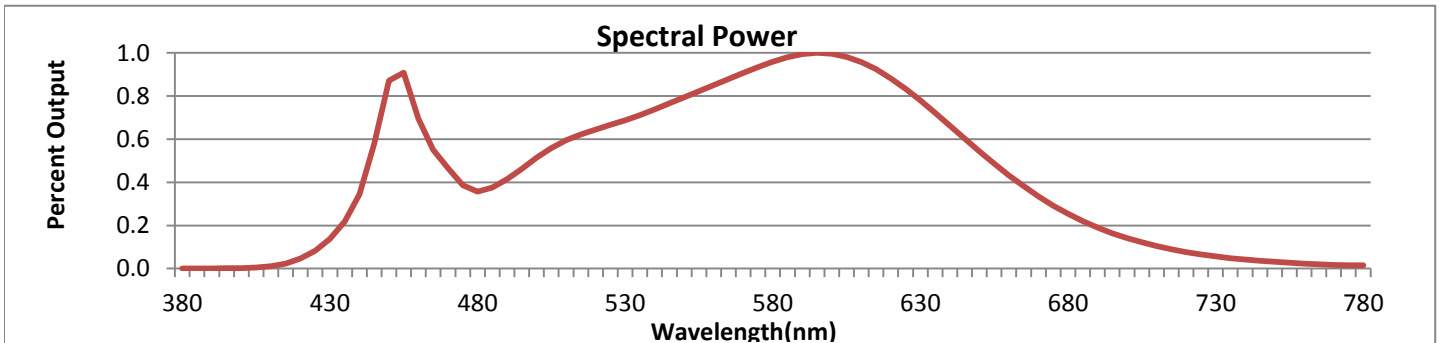


FIG. 1 LUMINAIRE

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



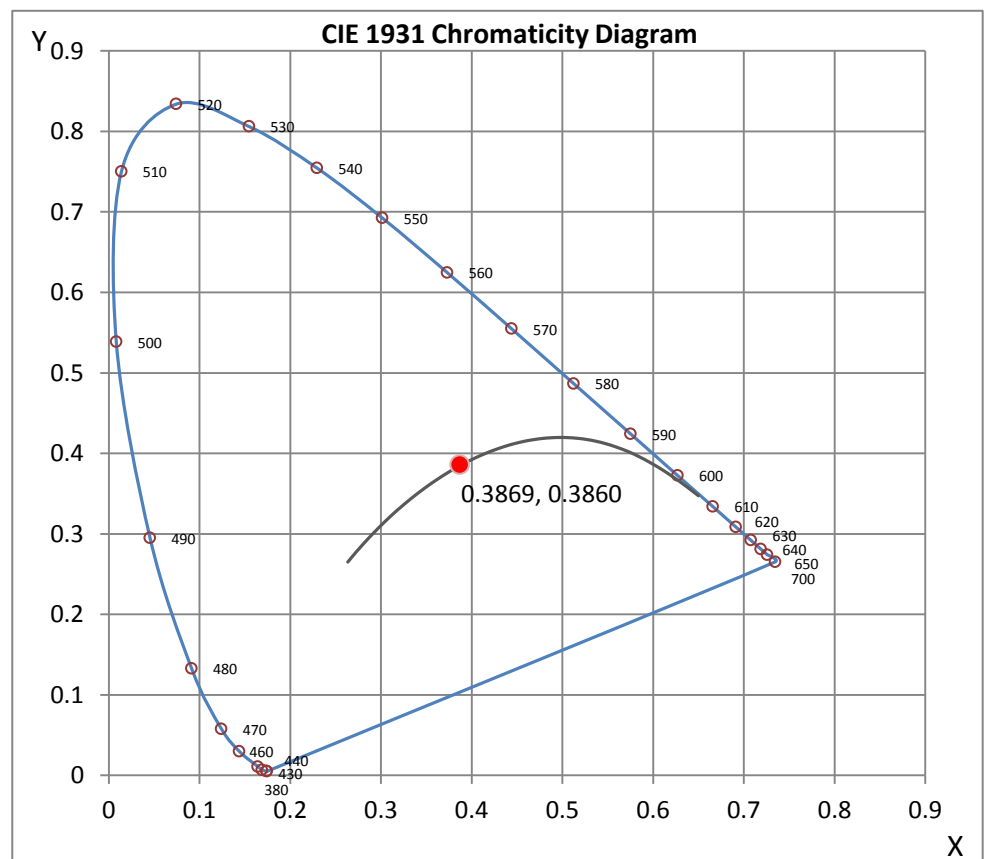
Wavelength	W/m ² nm	440	0.3451	510	0.5954	580	0.9595	650	0.5435	720	0.0766
380	0.0010	450	0.8714	520	0.6447	590	0.9943	660	0.4330	730	0.0564
390	0.0012	460	0.6945	530	0.6879	600	0.9964	670	0.3339	740	0.0418
400	0.0026	470	0.4657	540	0.7387	610	0.9580	680	0.2537	750	0.0310
410	0.0105	480	0.3571	550	0.7950	620	0.8824	690	0.1897	760	0.0233
420	0.0460	490	0.4145	560	0.8509	630	0.7788	700	0.1410	770	0.0174
430	0.1373	500	0.5133	570	0.9071	640	0.6625	710	0.1043	780	0.0151

CRI & CCT

x	0.3869
y	0.3860
u'	0.2257
v'	0.5065
CRI	84.40
CCT	3898
Duv	0.00244

R Values

R1	82.53
R2	91.35
R3	96.72
R4	82.04
R5	82.45
R6	88.01
R7	86.31
R8	65.40
R9	13.49
R10	79.47
R11	81.07
R12	65.63
R13	84.87
R14	98.36



*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.

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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 : L121605937R02.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
 [TEST] L121605937R02
 [TESTLAB] LIGHT LABORATORY, INC.
 [ISSUEDATE] 2/17/2017
 [MANUFAC] REVOLUTION LIGHTING
 [LUMCAT] 204481-113
 [LUMINAIRE] 2-LAMP EXTERNAL DRIVER T5 LAMP KIT 28W/LAMP 4000K DIMMABLE
 [BALLASTCAT] SL 28X2 -I580 120-277W D1 M
 [LAMPPOSITION] 0,0
 [LAMPCAT] N/A
 [OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND
 [MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.
 [_ TEST CONDITION] SL 28X2 -I580 120-277W D1 M 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 TUBE 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, 28.19W
 [TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	3512
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	125
Total Luminaire Watts	28.19
Ballast Factor	1.00
CIE Type	Semi-Direct
Spacing Criterion (0-180)	1.24
Spacing Criterion (90-270)	1.42
Spacing Criterion (Diagonal)	1.48
Basic Luminous Shape	Hor. Cylinder Along Length
Luminous Length (0-180)	3.67 ft
Luminous Width (90-270)	0.04 ft (Diameter)
Luminous Height	0.04 ft (Diameter)

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L121605937R02.IES

LUMINANCE DATA (cd/sq.m)

Angle In Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	5088055	51882	41917
55	3350228	45519	38918
65	2010360	39215	35676
75	939462	33432	32196
85	184778	28255	28638

**IES INDOOR REPORT
PHOTOMETRIC FILENAME : L121605937R02.IES**

CANDELA TABULATION

	<u>0.0</u>	<u>22.5</u>	<u>45.0</u>	<u>67.5</u>	<u>90.0</u>
0	666.16	666.16	666.16	666.16	666.16
5	663.05	664.25	663.46	664.13	663.63
10	652.83	655.04	656.57	659.64	660.06
15	635.40	639.67	645.07	651.84	653.58
20	611.98	618.67	629.34	640.96	644.45
25	583.67	592.84	609.66	627.51	633.74
30	549.45	561.70	586.41	611.69	621.03
35	509.68	527.49	561.12	593.92	606.50
40	466.92	489.21	533.26	574.45	589.56
45	420.42	448.52	503.83	553.02	572.21
50	362.21	406.05	473.31	530.98	552.11
55	320.69	362.46	442.46	507.44	531.27
60	267.30	316.62	411.61	483.56	509.68
65	212.91	276.72	381.47	458.99	487.01
70	158.43	236.03	349.79	434.28	463.43
75	106.04	198.13	325.38	409.58	439.51
80	60.95	165.82	298.85	384.83	414.77
85	21.51	139.09	275.06	361.33	390.94
90	4.48	118.66	252.81	338.04	367.94
95	2.49	104.25	232.50	315.71	345.18
100	3.32	94.99	214.69	295.24	323.01
105	4.24	88.19	199.00	274.93	301.09
110	3.57	84.70	184.96	255.63	280.83
115	2.49	84.70	171.68	237.28	260.24
120	1.99	85.40	158.81	219.72	240.89
125	0.00	85.61	150.80	202.61	221.87
130	0.00	84.08	143.03	186.63	203.77
135	0.00	83.83	134.06	173.75	186.33
140	0.00	77.27	122.85	162.25	173.13
145	0.00	66.47	112.27	151.58	160.34
150	0.00	56.09	106.50	134.48	145.90
155	0.00	48.00	95.70	118.83	134.27
160	0.00	37.16	73.61	106.00	121.32
165	0.00	19.43	56.17	69.00	94.99
170	0.00	6.93	33.13	48.20	57.13
175	0.00	3.49	8.06	12.12	13.78
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	245.43	N.A.	7.00
0-30	526.73	N.A.	15.00
0-40	877.64	N.A.	25.00
0-60	1653.06	N.A.	47.10
0-80	2335.79	N.A.	66.50
0-90	2604.86	N.A.	74.20
10-90	2541.71	N.A.	72.40
20-40	632.21	N.A.	18.00
20-50	1018.7	N.A.	29.00
40-70	1138.97	N.A.	32.40
60-80	682.73	N.A.	19.40
70-80	319.18	N.A.	9.10
80-90	269.07	N.A.	7.70
90-110	415.70	N.A.	11.80
90-120	571.08	N.A.	16.30
90-130	694.61	N.A.	19.80
90-150	852.95	N.A.	24.30
90-180	906.67	N.A.	25.80
110-180	490.97	N.A.	14.00
0-180	3511.53	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	63.15
10-20	182.29
20-30	281.29
30-40	350.92
40-50	386.49
50-60	388.94
60-70	363.55
70-80	319.18
80-90	269.07
90-100	226.18
100-110	189.52
110-120	155.38
120-130	123.53
130-140	93.76
140-150	64.58
150-160	38.05
160-170	14.26
170-180	1.41

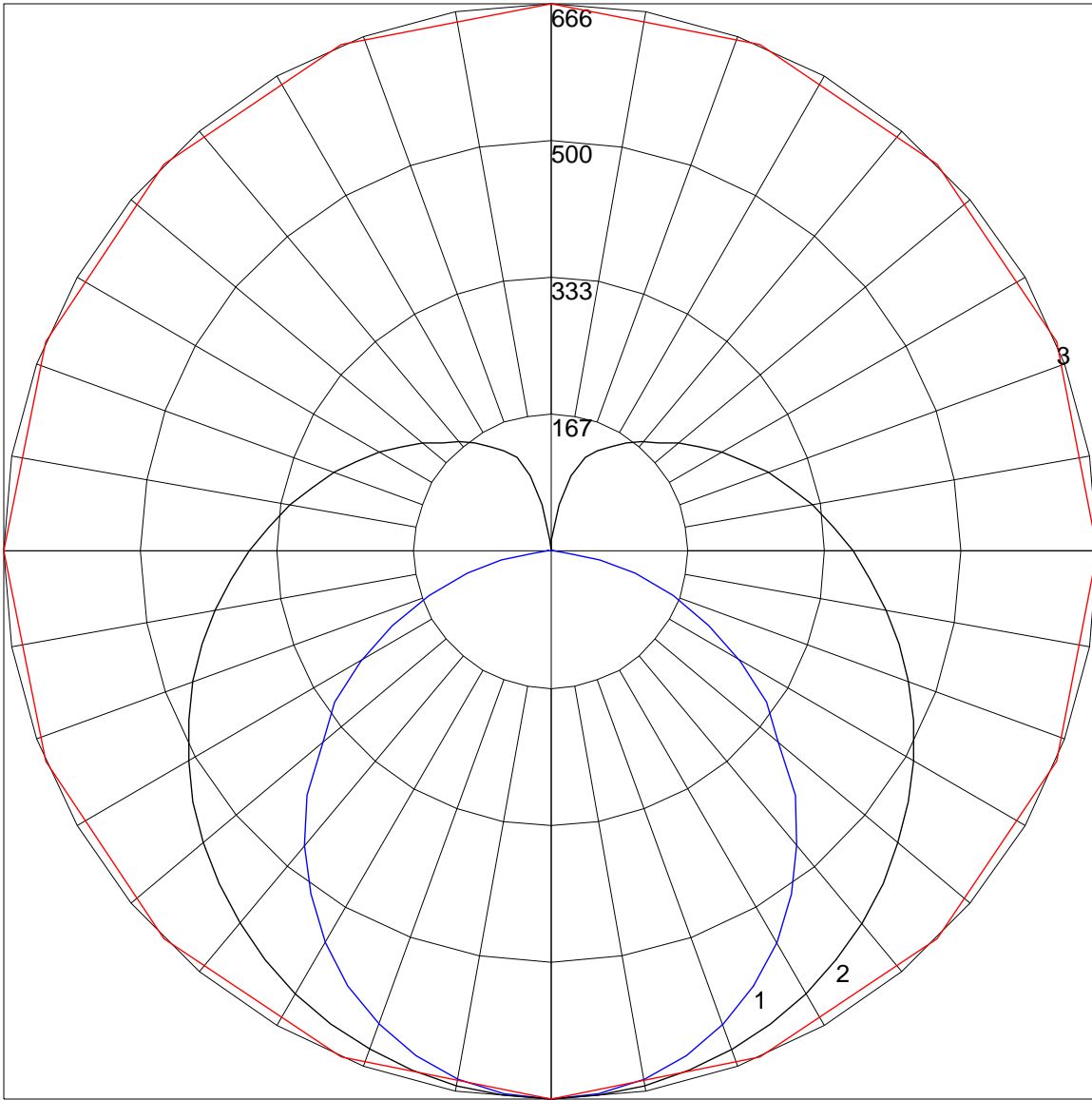
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COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	107	107	107	107	97	97	97	87	87	87	78	78	78	74
1	100	94	88	84	94	89	84	80	80	76	73	71	68	66	64	61	59	55
2	90	80	72	66	84	76	69	63	68	62	58	61	56	52	54	51	47	44
3	81	69	60	53	76	66	58	51	59	52	47	53	48	43	47	43	39	36
4	74	61	52	44	69	58	49	43	52	45	39	47	41	36	42	37	33	30
5	67	54	45	38	63	51	43	36	46	39	34	42	36	31	37	32	28	25
6	62	48	39	32	58	46	37	31	42	34	29	37	31	27	34	28	24	22
7	57	44	35	28	54	41	33	27	38	31	25	34	28	23	31	25	22	19
8	53	40	31	25	50	38	30	24	34	27	22	31	25	21	28	23	19	17
9	50	36	28	22	47	34	27	21	31	25	20	29	23	19	26	21	17	15
10	46	33	25	20	44	32	24	19	29	22	18	26	21	17	24	19	16	14

POLAR GRAPH



Maximum Candela = 666.16 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.)