



8165 E Kaiser Blvd. Anaheim, CA 92808
 p. 714.282.2270
 f. 714.676.5558

Report No: L091506506

Date: 9/25/2015



NVLAP LAB CODE 200927-0

Report No: L091506506

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

Model Number: 204222-012

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. Catalog number is 204222-012 . Received in working and undamaged condition. No modifications were necessary.

Testing Condition: SYLVANIA QUICKTRONIC QHE-2X32T8/UNV ISN-SC 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: 9/21/15

Date of Tests: 9/24/15 - 9/25/15

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 | 11/10/15 |
| Xitron Power Analysis System | 2503AH | MT-EL01 | 10/20/15 |
| BK Precision DC Power Supply | 1747 | PSDC-04 | 01/08/16 |
| Fluke Digital Thermometer | 52k/J | MT-TP02-GC | 01/05/16 |
| 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: | 204222-012 |
| Driver Model Number: | SYLVANIA QUICKTRONIC QHE 2X32T8/UNV ISN-SC |
| Total Lumens: | 2192.86 |
| Input Voltage (VAC/60Hz): | 120.00 |
| Input Current (Amp): | 0.15 |
| Input Power (W): | 17.82 |
| Input Power Factor: | 1.00 |
| Current ATHD @ 120V(%): | 5% |
| Current ATHD @ 277V(%): | N/A |
| Efficacy: | 123 |
| Color Rendering Index (CRI): | 84 |
| Correlated Color Temperature (K): | 3520 |
| Chromaticity Coordinate x: | 0.4022 |
| Chromaticity Coordinate y: | 0.3848 |
| Ambient Temperature (°C): | 25.0 |
| Stabilization Time (Hours): | 0:35 |
| Total Operating Time (Hours): | 1:05 |
| Off State Power(W): | 0.00 |

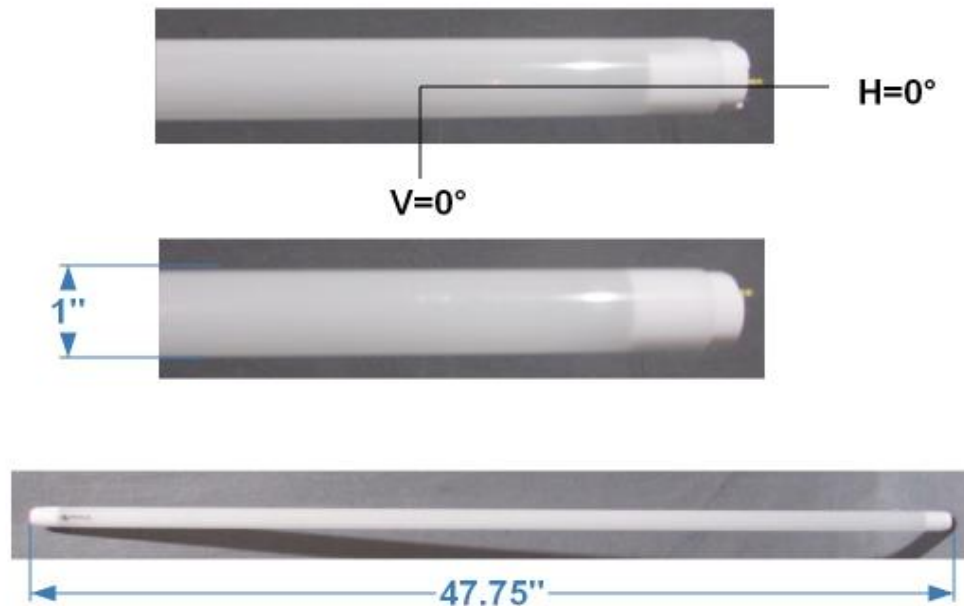
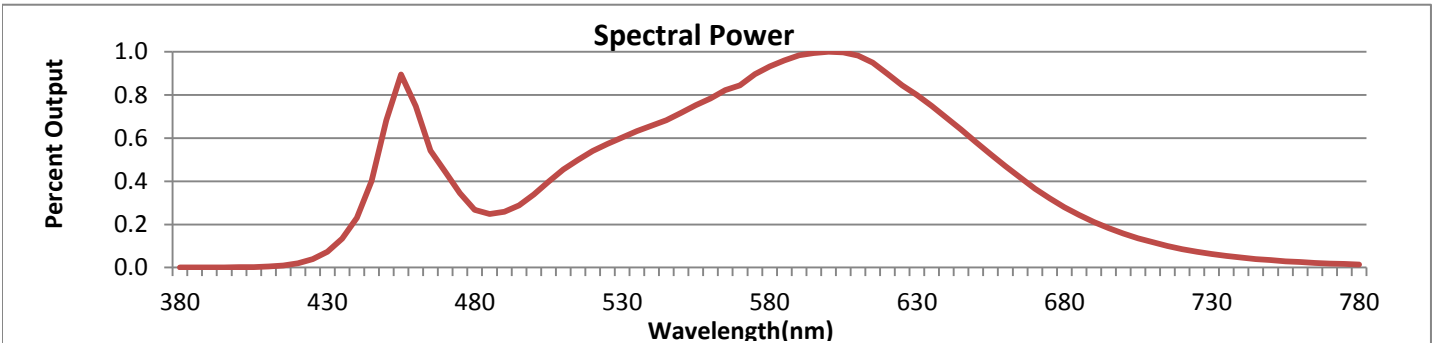


FIG. 1 LUMINAIRE

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



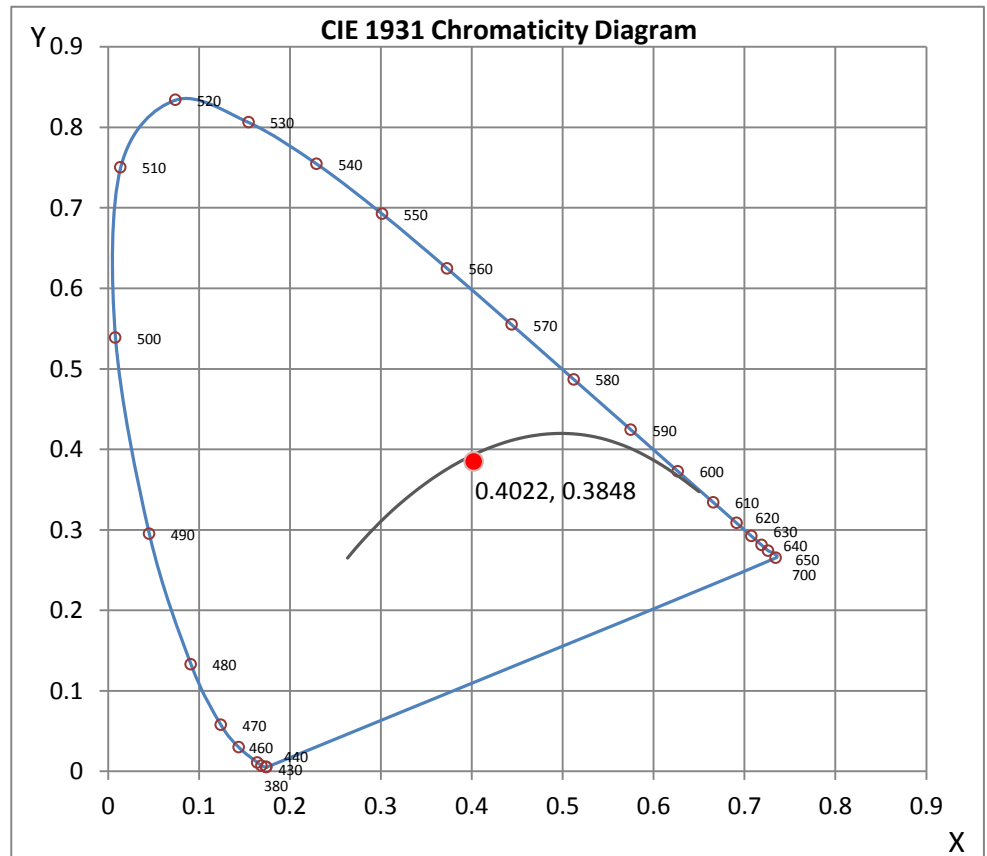
| Wavelength | W/m ² nm | 440 | 0.2308 | 510 | 0.4539 | 580 | 0.9330 | 650 | 0.5825 | 720 | 0.0852 |
|------------|---------------------|-----|--------|-----|--------|-----|--------|-----|--------|-----|--------|
| 380 | 0.0009 | 450 | 0.6831 | 520 | 0.5400 | 590 | 0.9840 | 660 | 0.4705 | 730 | 0.0627 |
| 390 | 0.0010 | 460 | 0.7481 | 530 | 0.6030 | 600 | 1.0000 | 670 | 0.3663 | 740 | 0.0463 |
| 400 | 0.0014 | 470 | 0.4435 | 540 | 0.6579 | 610 | 0.9830 | 680 | 0.2800 | 750 | 0.0342 |
| 410 | 0.0043 | 480 | 0.2682 | 550 | 0.7167 | 620 | 0.8981 | 690 | 0.2114 | 760 | 0.0250 |
| 420 | 0.0198 | 490 | 0.2584 | 560 | 0.7844 | 630 | 0.8006 | 700 | 0.1579 | 770 | 0.0187 |
| 430 | 0.0738 | 500 | 0.3391 | 570 | 0.8449 | 640 | 0.6954 | 710 | 0.1178 | 780 | 0.0140 |

CRI & CCT

| | |
|-----|----------|
| x | 0.4022 |
| y | 0.3848 |
| u' | 0.2361 |
| v' | 0.5083 |
| CRI | 84.20 |
| CCT | 3520 |
| Duv | -0.00194 |

R Values

| | |
|-----|-------|
| R1 | 83.42 |
| R2 | 92.11 |
| R3 | 95.97 |
| R4 | 81.11 |
| R5 | 82.48 |
| R6 | 88.07 |
| R7 | 84.98 |
| R8 | 65.29 |
| R9 | 18.22 |
| R10 | 79.85 |
| R11 | 79.27 |
| R12 | 63.57 |
| R13 | 85.85 |
| R14 | 98.08 |



*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: 6*



8165 E. Kaiser Blvd. Anaheim, CA 92808
 p. 714.282.2270
 f. 714.676.5558

Photometric Test Report

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L091506506.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
 [TEST] L091506506
 [TESTLAB] LIGHT LABORATORY, INC.
 [ISSUEDATE] 9/25/2015
 [MANUFAC] REVOLUTION LIGHTING TECHNOLOGIES
 [LUMCAT] 204222-012
 [LUMINAIRE] 17W 4ft Ballast-Ready Tube 3500K
 [MORE] SIZE: 1"DIA. X 47.75"L.
 [BALLASTCAT] SYLVANIA QUICKTRONIC QHE 2X32T8/UNV ISN-SC
 [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] SYLVANIA QUICKTRONIC QHE 2X32T8/UNV ISN-SC WAS CONNECTED TO TWO LED TUBES
 [MORE] FROM THE DRIVER OUTPUT. PHOTOMETRIC MEASUREMENTS WERE MEASURED FROM
 [MORE] A SINGLE LED FIXTURE WHILE THE OTHER LAMPS WERE 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, 17.82W
 [TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

| | |
|---------------------------------|---------------------|
| Lumens Per Lamp | N.A. (absolute) |
| Total Lamp Lumens | N.A. (absolute) |
| Luminaire Lumens | 2193 |
| Total Luminaire Efficiency | N.A. |
| Luminaire Efficacy Rating (LER) | 123 |
| Total Luminaire Watts | 17.82 |
| Ballast Factor | 1.00 |
| CIE Type | Semi-Direct |
| Spacing Criterion (0-180) | 1.20 |
| Spacing Criterion (90-270) | 1.36 |
| Spacing Criterion (Diagonal) | 1.40 |
| Basic Luminous Shape | Rectangular w/Sides |
| Luminous Length (0-180) | 3.65 ft |
| Luminous Width (90-270) | 0.08 ft |
| Luminous Height | 0.06 ft |

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L091506506.IES

LUMINANCE DATA (cd/sq.m)

| Angle In Degrees | Average 0-Deg | Average 45-Deg | Average 90-Deg |
|---------------------|------------------|-------------------|-------------------|
| 45 | 16435 | 12910 | 12853 |
| 55 | 14719 | 11489 | 11636 |
| 65 | 12623 | 10212 | 10426 |
| 75 | 10351 | 9219 | 9648 |
| 85 | 4450 | 8669 | 9010 |

**IES INDOOR REPORT
PHOTOMETRIC FILENAME : L091506506.IES**

CANDELA TABULATION

| | <u>0.0</u> | <u>22.5</u> | <u>45.0</u> | <u>67.5</u> | <u>90.0</u> |
|------------|------------|-------------|-------------|-------------|-------------|
| 0 | 553.79 | 553.79 | 553.79 | 553.79 | 553.79 |
| 5 | 549.87 | 550.64 | 551.24 | 552.01 | 552.78 |
| 10 | 539.93 | 541.26 | 543.87 | 546.74 | 548.41 |
| 15 | 523.13 | 525.88 | 531.75 | 538.00 | 540.53 |
| 20 | 499.65 | 504.92 | 515.46 | 525.36 | 530.42 |
| 25 | 471.21 | 479.26 | 494.86 | 509.81 | 516.54 |
| 30 | 439.07 | 448.16 | 470.13 | 490.91 | 499.14 |
| 35 | 402.31 | 414.99 | 443.27 | 468.93 | 479.09 |
| 40 | 355.61 | 378.62 | 413.67 | 444.09 | 456.90 |
| 45 | 320.74 | 339.54 | 382.22 | 417.61 | 431.87 |
| 50 | 279.00 | 302.31 | 349.74 | 389.20 | 403.94 |
| 55 | 234.62 | 264.14 | 317.44 | 359.72 | 375.32 |
| 60 | 191.69 | 226.31 | 285.39 | 328.88 | 345.50 |
| 65 | 149.96 | 189.67 | 253.38 | 299.87 | 312.08 |
| 70 | 109.77 | 155.78 | 223.18 | 270.35 | 286.46 |
| 75 | 77.21 | 126.35 | 195.84 | 242.03 | 257.58 |
| 80 | 37.70 | 99.57 | 170.65 | 214.74 | 230.25 |
| 85 | 12.51 | 78.28 | 147.60 | 190.66 | 204.11 |
| 90 | 0.69 | 60.88 | 127.63 | 168.81 | 181.92 |
| 95 | 0.00 | 48.54 | 110.37 | 148.41 | 161.18 |
| 100 | 0.00 | 39.50 | 96.57 | 130.72 | 142.07 |
| 105 | 0.00 | 33.46 | 82.90 | 115.47 | 125.71 |
| 110 | 0.00 | 29.13 | 72.96 | 101.80 | 111.57 |
| 115 | 0.00 | 25.32 | 63.24 | 89.33 | 99.23 |
| 120 | 0.00 | 23.01 | 55.40 | 78.62 | 86.72 |
| 125 | 0.00 | 20.99 | 48.29 | 69.28 | 76.26 |
| 130 | 0.00 | 18.77 | 41.52 | 60.07 | 66.41 |
| 135 | 0.00 | 16.97 | 35.18 | 51.37 | 57.33 |
| 140 | 0.00 | 15.04 | 29.91 | 44.34 | 49.10 |
| 145 | 0.00 | 13.07 | 25.24 | 38.00 | 41.56 |
| 150 | 0.00 | 11.35 | 21.81 | 30.68 | 35.65 |
| 155 | 0.00 | 9.94 | 18.89 | 24.94 | 30.08 |
| 160 | 0.00 | 8.44 | 15.00 | 19.71 | 24.59 |
| 165 | 0.00 | 7.33 | 11.74 | 14.40 | 18.77 |
| 170 | 0.00 | 6.81 | 8.53 | 10.03 | 12.00 |
| 175 | 0.00 | 6.94 | 6.60 | 6.47 | 4.54 |
| 180 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L091506506.IES

ZONAL LUMEN SUMMARY

| Zone | Lumens | %Lamp | %Fixt |
|---------|---------|-------|--------|
| 0-20 | 202.51 | N.A. | 9.20 |
| 0-30 | 430.40 | N.A. | 19.60 |
| 0-40 | 706.89 | N.A. | 32.20 |
| 0-60 | 1278.52 | N.A. | 58.30 |
| 0-80 | 1713.94 | N.A. | 78.20 |
| 0-90 | 1858.28 | N.A. | 84.70 |
| 10-90 | 1805.88 | N.A. | 82.40 |
| 20-40 | 504.38 | N.A. | 23.00 |
| 20-50 | 796.99 | N.A. | 36.30 |
| 40-70 | 813.53 | N.A. | 37.10 |
| 60-80 | 435.42 | N.A. | 19.90 |
| 70-80 | 193.53 | N.A. | 8.80 |
| 80-90 | 144.33 | N.A. | 6.60 |
| 90-110 | 185.10 | N.A. | 8.40 |
| 90-120 | 241.94 | N.A. | 11.00 |
| 90-130 | 281.69 | N.A. | 12.80 |
| 90-150 | 322.89 | N.A. | 14.70 |
| 90-180 | 334.58 | N.A. | 15.30 |
| 110-180 | 149.48 | N.A. | 6.80 |
| 0-180 | 2192.86 | N.A. | 100.00 |

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

| Zone | Lumens |
|---------|--------|
| 0-10 | 52.39 |
| 10-20 | 150.11 |
| 20-30 | 227.89 |
| 30-40 | 276.49 |
| 40-50 | 292.61 |
| 50-60 | 279.02 |
| 60-70 | 241.90 |
| 70-80 | 193.53 |
| 80-90 | 144.33 |
| 90-100 | 106.56 |
| 100-110 | 78.54 |
| 110-120 | 56.84 |
| 120-130 | 39.74 |
| 130-140 | 25.82 |
| 140-150 | 15.38 |
| 150-160 | 8.02 |
| 160-170 | 3.13 |
| 170-180 | 0.55 |

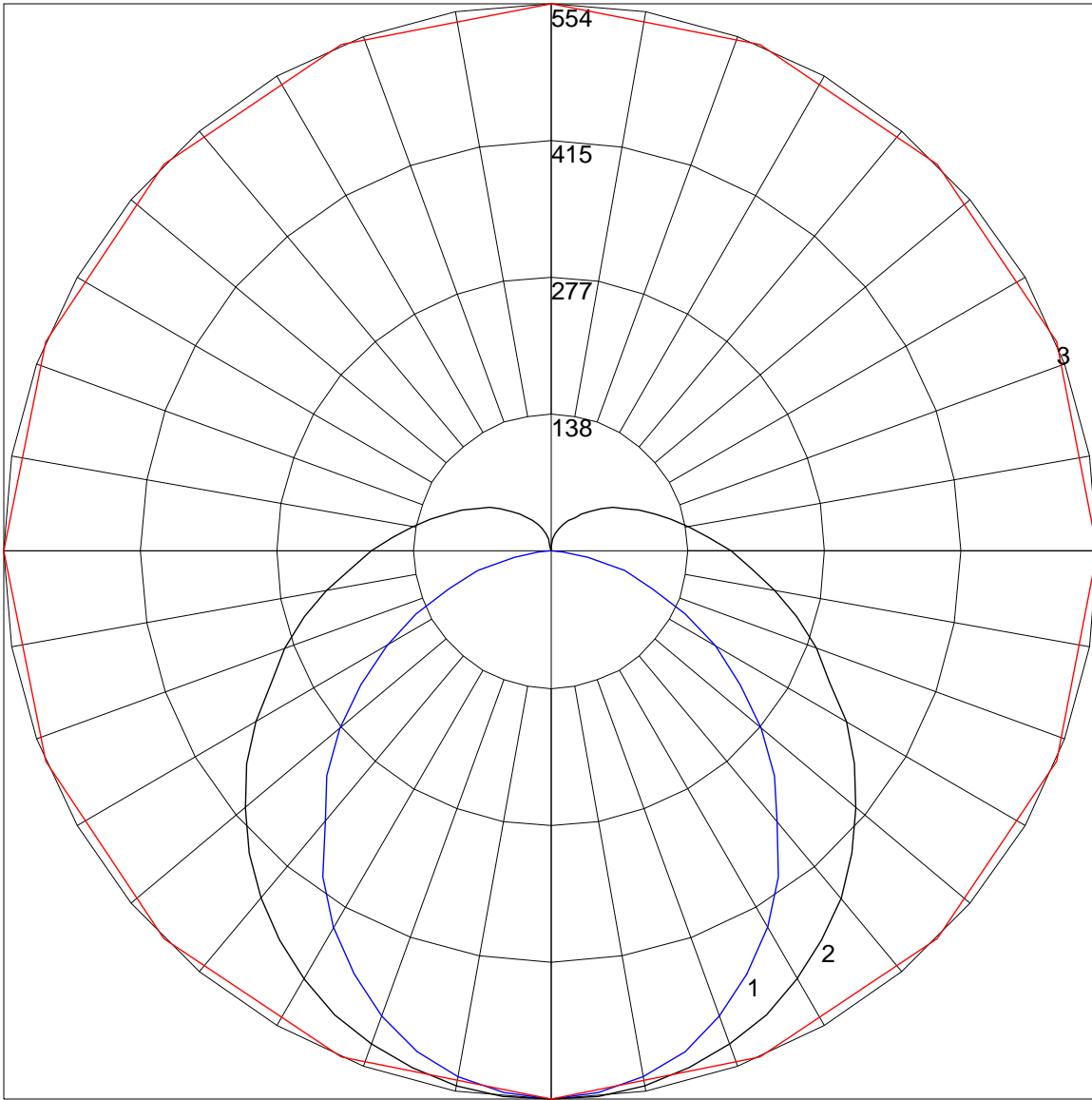
IES INDOOR REPORT
PHOTOMETRIC FILENAME : L091506506.IES

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 | 115 | 115 | 115 | 115 | 115 | 111 | 111 | 111 | 111 | 103 | 103 | 103 | 95 | 95 | 95 | 88 | 88 | 88 | 85 |
| 1 | 103 | 97 | 92 | 87 | 87 | 98 | 93 | 89 | 84 | 86 | 82 | 79 | 80 | 77 | 74 | 74 | 71 | 69 | 66 |
| 2 | 93 | 83 | 76 | 69 | 69 | 88 | 80 | 73 | 67 | 74 | 68 | 63 | 68 | 64 | 60 | 63 | 60 | 56 | 53 |
| 3 | 84 | 73 | 64 | 57 | 57 | 80 | 70 | 62 | 55 | 65 | 58 | 52 | 60 | 54 | 50 | 55 | 51 | 47 | 44 |
| 4 | 77 | 64 | 55 | 48 | 48 | 73 | 62 | 53 | 46 | 57 | 50 | 44 | 53 | 47 | 42 | 49 | 44 | 40 | 37 |
| 5 | 70 | 57 | 48 | 41 | 41 | 67 | 55 | 46 | 40 | 51 | 44 | 38 | 47 | 41 | 36 | 44 | 39 | 34 | 32 |
| 6 | 65 | 51 | 42 | 35 | 35 | 62 | 49 | 41 | 34 | 46 | 38 | 33 | 43 | 36 | 31 | 40 | 34 | 30 | 28 |
| 7 | 60 | 46 | 37 | 31 | 31 | 57 | 45 | 36 | 30 | 42 | 34 | 29 | 39 | 33 | 28 | 36 | 31 | 27 | 24 |
| 8 | 56 | 42 | 33 | 27 | 27 | 53 | 41 | 33 | 27 | 38 | 31 | 26 | 36 | 29 | 25 | 33 | 28 | 24 | 22 |
| 9 | 52 | 38 | 30 | 25 | 25 | 50 | 37 | 29 | 24 | 35 | 28 | 23 | 33 | 27 | 22 | 31 | 25 | 21 | 19 |
| 10 | 49 | 35 | 27 | 22 | 22 | 47 | 34 | 27 | 22 | 32 | 26 | 21 | 30 | 24 | 20 | 29 | 23 | 19 | 17 |

POLAR GRAPH



Maximum Candela = 553.79 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.)