

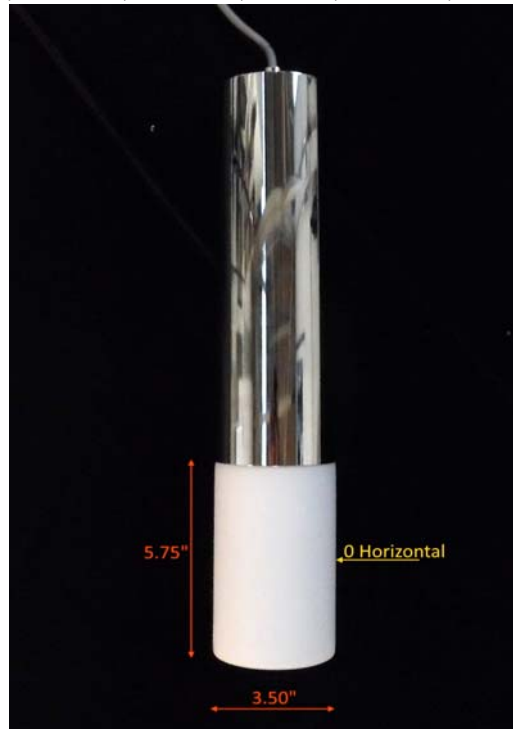
# Report of Test

## LLIA000824-039A

Catalog Number: 3-654 Opus Pendant

Pendant mounted, formed steel canopy, spun aluminum housing, cast aluminum heatsink, translucent white glass enclosure.

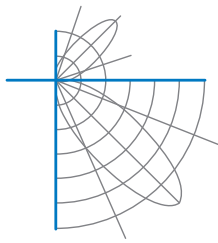
12 white LEDs, one Harvard Engineering LEDENG-163-930 LED board  
One L.T.F. DA6W150C2040LP010-0014 dimmable LED driver  
120.0Vac, 60.00Hz, 0.0597A, 6.72W, 0.938PF, 9.9%THD(i)



### Performance Summary

|                    |           |
|--------------------|-----------|
| Total Light Output | 412 lm    |
| Luminaire Power    | 6.72 W    |
| Luminous Efficacy  | 61.3 lm/W |

**PREPARED FOR : Oxygen Lighting, 201 Railhead Road, Fort Worth, TX 76106, USA**



**Test Report No. LLIA000824-039A**

Catalog Number: 3-654 Opus Pendant

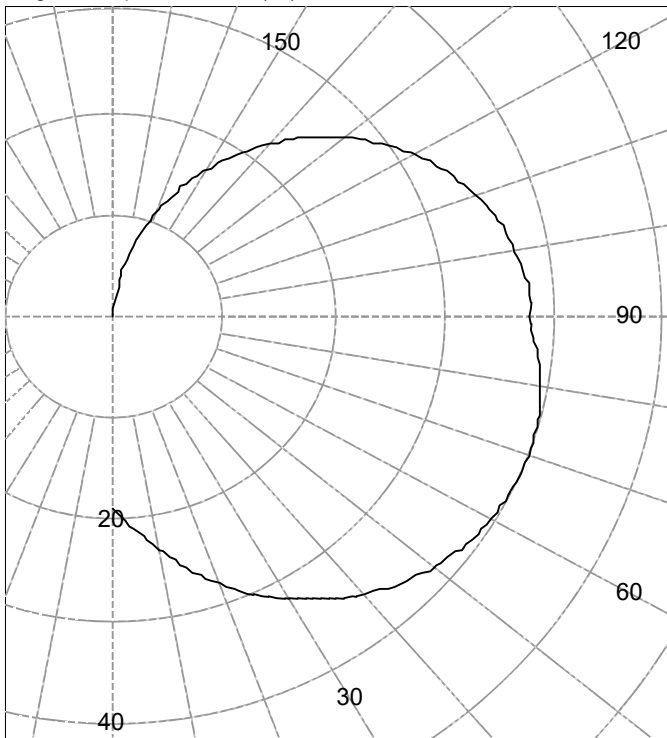
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Legend: All planes - Solid (cd)



(Rotational symmetry)

**AVERAGE LUMINANCE (cd / m<sup>2</sup>)**

| Gamma | C0   |
|-------|------|
| 45.0  | 2725 |
| 55.0  | 2750 |
| 65.0  | 2780 |
| 75.0  | 2816 |
| 85.0  | 2857 |

**INTENSITY SUMMARY (cd)**

| Gamma | All Planes | Flux (lm) | Gamma | C0   | Flux (lm) |
|-------|------------|-----------|-------|------|-----------|
| 0     | 19.0       |           | 90    | 37.8 |           |
| 5     | 21.1       | 2         | 95    | 37.7 | 41        |
| 10    | 23.2       |           | 100   | 37.1 |           |
| 15    | 25.7       | 7         | 105   | 36.2 | 38        |
| 20    | 28.0       |           | 110   | 35.0 |           |
| 25    | 30.2       | 14        | 115   | 33.5 | 33        |
| 30    | 32.2       |           | 120   | 31.8 |           |
| 35    | 34.0       | 21        | 125   | 29.7 | 27        |
| 40    | 35.6       |           | 130   | 27.4 |           |
| 45    | 37.0       | 29        | 135   | 24.8 | 19        |
| 50    | 38.2       |           | 140   | 22.2 |           |
| 55    | 39.1       | 35        | 145   | 19.3 | 12        |
| 60    | 39.7       |           | 150   | 16.4 |           |
| 65    | 40.0       | 40        | 155   | 13.5 | 6         |
| 70    | 40.1       |           | 160   | 10.5 |           |
| 75    | 39.9       | 42        | 165   | 7.6  | 2         |
| 80    | 39.4       |           | 170   | 4.7  |           |
| 85    | 38.5       | 42        | 175   | 0.8  | 0         |
| 90    | 37.8       |           | 180   | 0.0  |           |

**ZONAL FLUX AND PERCENTAGES**

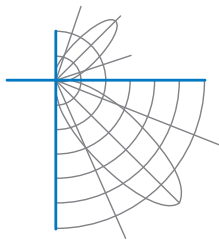
| Zone   | Flux (lm) | %Lamp | %Luminaire |
|--------|-----------|-------|------------|
| 0-30   | 23        | N / A | 5.7        |
| 0-40   | 45        | N / A | 10.9       |
| 0-60   | 109       | N / A | 26.3       |
| 0-90   | 232       | N / A | 56.4       |
| 40-90  | 188       | N / A | 45.5       |
| 60-90  | 124       | N / A | 30.1       |
| 90-180 | 179       | N / A | 43.6       |
| 0-180  | 412       | N / A | 100.0      |

Total Light Output = 412 lm

Signed:

Authorized Signatory

Date of test 13-Sep-2017  
Date of report 14-Sep-2017



**Test Report No. LLIA000824-039A**

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Pendant mounted, formed steel canopy, spun aluminum housing, cast aluminum heatsink, translucent white glass enclosure.

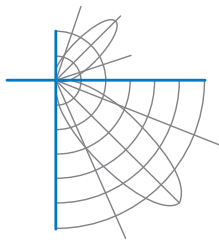
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**Intensity (cd) and Flux (lm) data**

| Gamma | Intensity | Flux | Gamma | Intensity | Flux |
|-------|-----------|------|-------|-----------|------|
| 0.0   | 19.0      |      | 90.0  | 37.8      |      |
| 2.5   | 19.8      |      | 92.5  | 37.9      |      |
| 5.0   | 21.1      | 2    | 95.0  | 37.7      |      |
| 7.5   | 22.0      |      | 97.5  | 37.4      | 41   |
| 10.0  | 23.2      |      | 100.0 | 37.1      |      |
| 12.5  | 24.5      |      | 102.5 | 36.7      |      |
| 15.0  | 25.7      | 7    | 105.0 | 36.2      |      |
| 17.5  | 26.8      |      | 107.5 | 35.7      | 38   |
| 20.0  | 28.0      |      | 110.0 | 35.0      |      |
| 22.5  | 29.1      |      | 112.5 | 34.3      |      |
| 25.0  | 30.2      | 14   | 115.0 | 33.5      |      |
| 27.5  | 31.2      |      | 117.5 | 32.7      | 33   |
| 30.0  | 32.2      |      | 120.0 | 31.8      |      |
| 32.5  | 33.1      |      | 122.5 | 30.7      |      |
| 35.0  | 34.0      | 21   | 125.0 | 29.7      |      |
| 37.5  | 34.8      |      | 127.5 | 28.6      | 27   |
| 40.0  | 35.6      |      | 130.0 | 27.4      |      |
| 42.5  | 36.3      |      | 132.5 | 26.1      |      |
| 45.0  | 37.0      | 29   | 135.0 | 24.8      |      |
| 47.5  | 37.6      |      | 137.5 | 23.5      | 19   |
| 50.0  | 38.2      |      | 140.0 | 22.2      |      |
| 52.5  | 38.7      |      | 142.5 | 20.8      |      |
| 55.0  | 39.1      | 35   | 145.0 | 19.3      |      |
| 57.5  | 39.4      |      | 147.5 | 17.9      | 12   |
| 60.0  | 39.7      |      | 150.0 | 16.4      |      |
| 62.5  | 39.9      |      | 152.5 | 15.0      |      |
| 65.0  | 40.0      | 40   | 155.0 | 13.5      |      |
| 67.5  | 40.1      |      | 157.5 | 12.0      | 6    |
| 70.0  | 40.1      |      | 160.0 | 10.5      |      |
| 72.5  | 40.0      |      | 162.5 | 9.0       |      |
| 75.0  | 39.9      | 42   | 165.0 | 7.6       |      |
| 77.5  | 39.7      |      | 167.5 | 6.1       | 2    |
| 80.0  | 39.4      |      | 170.0 | 4.7       |      |
| 82.5  | 39.0      |      | 172.5 | 3.1       |      |
| 85.0  | 38.5      | 42   | 175.0 | 0.8       |      |
| 87.5  | 38.1      |      | 177.5 | 0.0       | 0    |
| 90.0  | 37.8      |      | 180.0 | 0.0       |      |



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**Coefficients Of Utilization - Zonal Cavity Method**

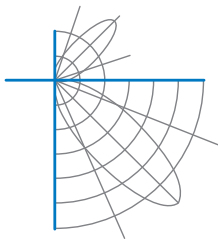
Effective Floor Cavity Reflectance 0.20

| RC | 80  |     |     |     | 70  |     |     |     | 50 |    |    | 30 |    |    | 10 |    |    | 0  |
|----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|
|    | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 0  |
| 0  | 109 | 109 | 109 | 109 | 101 | 101 | 101 | 101 | 87 | 87 | 87 | 74 | 74 | 74 | 62 | 62 | 62 | 56 |
| 1  | 94  | 87  | 82  | 76  | 87  | 81  | 76  | 71  | 68 | 64 | 61 | 57 | 54 | 51 | 47 | 44 | 42 | 37 |
| 2  | 84  | 74  | 65  | 58  | 77  | 68  | 60  | 54  | 57 | 51 | 46 | 47 | 43 | 39 | 38 | 35 | 32 | 27 |
| 3  | 75  | 63  | 54  | 46  | 69  | 58  | 50  | 43  | 49 | 42 | 37 | 40 | 35 | 31 | 32 | 28 | 25 | 20 |
| 4  | 68  | 55  | 45  | 38  | 62  | 50  | 42  | 35  | 42 | 35 | 30 | 35 | 29 | 25 | 28 | 23 | 20 | 16 |
| 5  | 62  | 48  | 38  | 31  | 57  | 44  | 36  | 29  | 37 | 30 | 25 | 31 | 25 | 21 | 24 | 20 | 16 | 13 |
| 6  | 57  | 43  | 33  | 26  | 52  | 39  | 31  | 25  | 33 | 26 | 21 | 27 | 22 | 17 | 22 | 17 | 14 | 11 |
| 7  | 52  | 38  | 29  | 23  | 48  | 35  | 27  | 21  | 30 | 23 | 18 | 25 | 19 | 15 | 20 | 15 | 12 | 9  |
| 8  | 48  | 34  | 26  | 20  | 44  | 32  | 24  | 18  | 27 | 20 | 16 | 22 | 17 | 13 | 18 | 14 | 10 | 8  |
| 9  | 45  | 31  | 23  | 17  | 41  | 29  | 21  | 16  | 24 | 18 | 14 | 20 | 15 | 11 | 16 | 12 | 9  | 7  |
| 10 | 42  | 28  | 20  | 15  | 38  | 26  | 19  | 14  | 22 | 16 | 12 | 19 | 14 | 10 | 15 | 11 | 8  | 6  |

For absolute test reports, CUs are expressed as a percentage of total lumen output. Calculations were based on published IES procedures, and are based on the zonal cavity method. Basic assumptions: 1) Room surfaces are lambertian reflectors. 2) Incident flux on each surface is uniformly distributed. 3) The room is spectrally neutral. When luminaires are not evenly distributed throughout the room, or do not exhibit lateral symmetry, CU values may differ from actual performance.

**Circle of Light Plot**

| Height(ft) | Illuminance at Nadir (fc) | Beam Width<br>(across 50% Nadir Illum) |        |
|------------|---------------------------|--|--------|
|            |                           | 0-180                                  | 90-270 |
| 6.0        | 0.5                       | 14.89                                  | 14.89  |
| 8.0        | 0.3                       | 19.85                                  | 19.85  |
| 10.0       | 0.2                       | 24.81                                  | 24.81  |
| 12.0       | 0.1                       | 29.77                                  | 29.77  |
| 14.0       | 0.1                       | 34.74                                  | 34.74  |
| 16.0       | 0.1                       | 39.70                                  | 39.70  |



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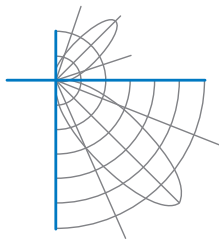
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**Test Distance**            9.5 m  
**Test Temperature**      24.9 °C

**Notes**

The laboratory has not participated in the selection of samples to be tested. All testing is performed on the understanding that the significance of the report is limited to the extent that the test sample is representative of production units.

Tested in accordance with the applicable sections of publications: IES LM-79-08 (Sec. 12), IES LM-16-93, IES LM-58-13, CIE 13.3:1995, CIE 15:2004, ANSI C78.377:2015, ANSI C82.77-10:2014.

The luminous intensity values, and other derived quantities, contained in this report are based on the absolute data, as measured.

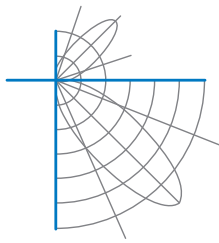
Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results.

This report is free of erasures and corrections.

Photometric intensity values are reported using the CIE Gamma coordinate system as defined in CIE publication number 121.

This report may contain data that are not covered by the NVLAP accreditation. Quantities marked with \* are not covered.

This report must not be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the Federal Government.



## Report of Test

**LLIA000824-039B**

Integrating Sphere Report

Catalog Number: 3-654 Opus Pendant

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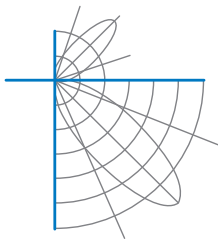


### Performance Summary

|                     |                  |
|---------------------|------------------|
| Voltage             | 120.0 Vac        |
| Current             | 0.0596 A         |
| Power               | 6.71 W           |
| Frequency           | 60.00 Hz         |
| Power Factor        | 0.938            |
| Current THD         | 10.0 %           |
| <br>                |                  |
| Total Luminous Flux | 408.8 lm         |
| Efficacy            | 60.9 lm/W        |
| Chromaticity (x,y)  | (0.4303, 0.3973) |
| (u',v')             | (0.2492, 0.5177) |
| Duv                 | -0.0018          |
| CCT                 | 3059 K           |
| CRI (Ra)            | 97               |
| R9                  | 87               |

Prepared For:  
Oxygen Lighting  
201 Railhead Road  
Fort Worth, TX 76106, USA

Test date: 09/13/2017  
Report date: 09/14/2017



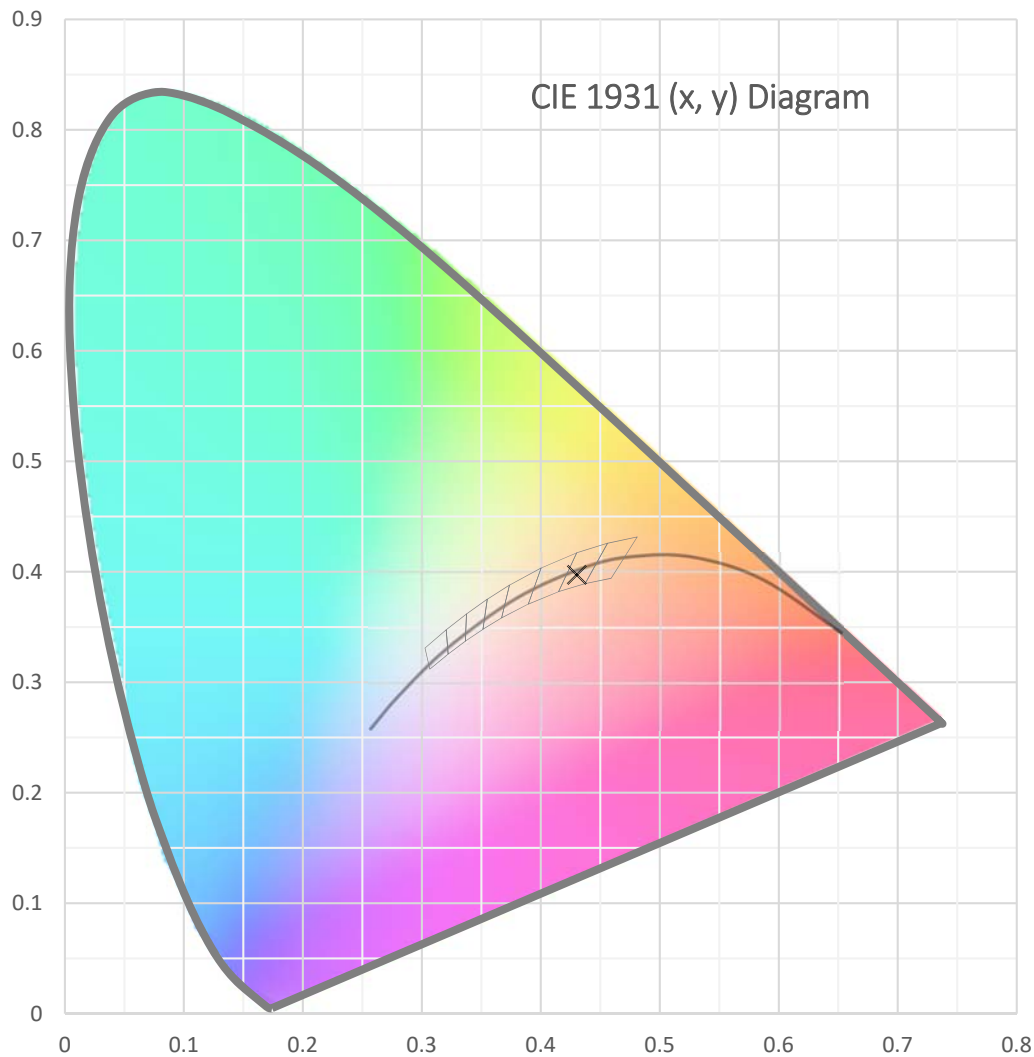
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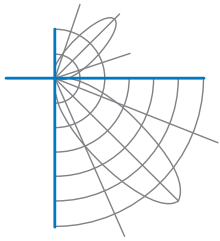
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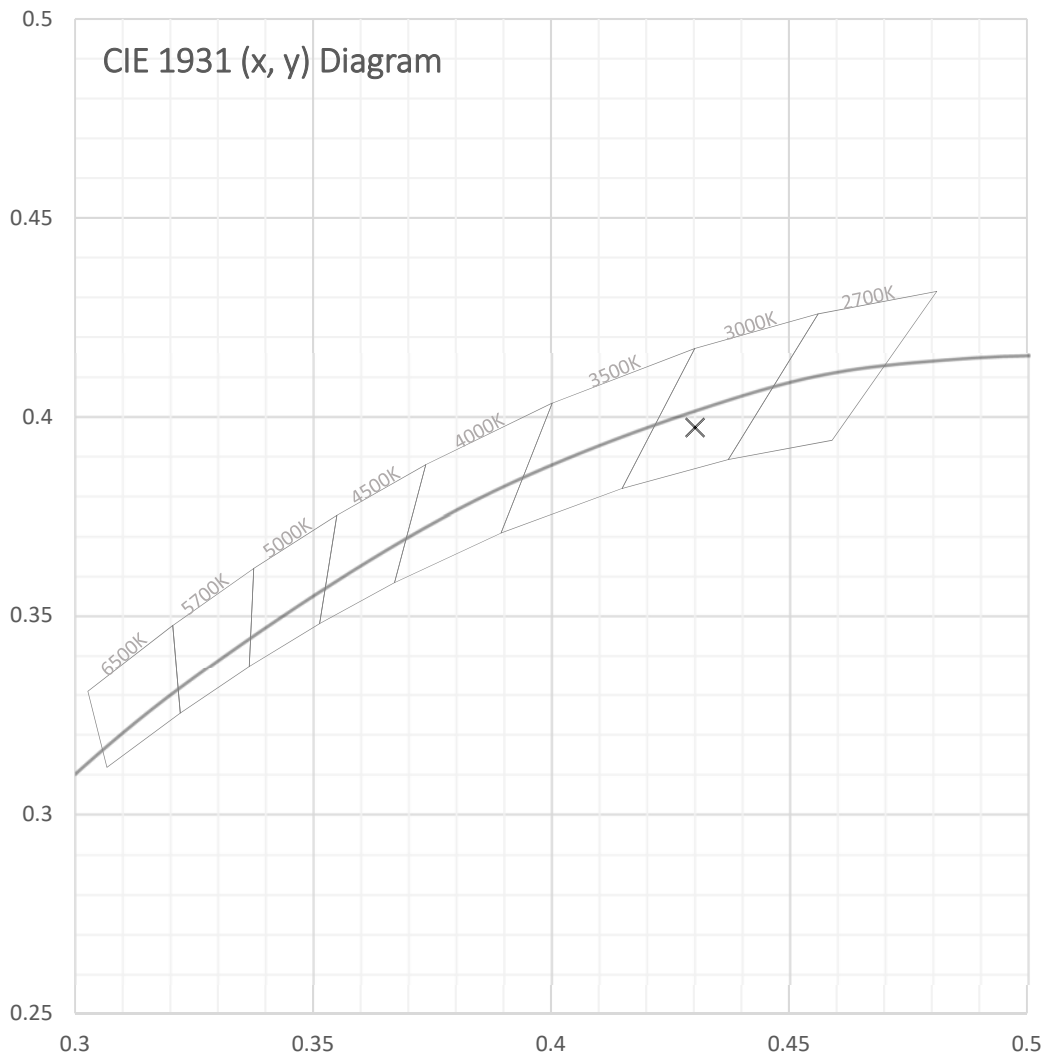
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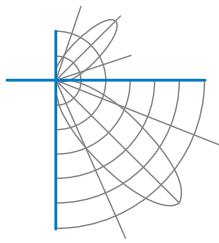
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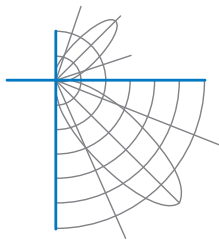
One L.T.F. DA6W150C2040LP010-0014 dimmable LED driver

**Spectral Data**

|                                     |                  |
|-------------------------------------|------------------|
| Total Radiant Flux                  | 1.536 W          |
| Total Luminous Flux                 | 408.8 Lm         |
| Chromaticity CIE 1931 (x, y)        | (0.4303, 0.3973) |
| Chromaticity CIE 1976 (u', v')      | (0.2492, 0.5177) |
| Correlated Color Temperature (CCT)  | 3059 K           |
| Color Rendering Index (Ra)          | 97               |
| R1                                  | 98               |
| R2                                  | 98               |
| R3                                  | 96               |
| R4                                  | 97               |
| R5                                  | 97               |
| R6                                  | 96               |
| R7                                  | 97               |
| R8                                  | 94               |
| R9                                  | 87               |
| R10                                 | 94               |
| R11                                 | 97               |
| R12                                 | 84               |
| R13                                 | 98               |
| R14                                 | 97               |
| Distance from Planckian Locus (Duv) | -0.0018          |
| Scotopic/Photopic Ratio *           | 1.469            |

**Electrical Data**

|              |           |
|--------------|-----------|
| Voltage      | 120.0 Vac |
| Current      | 0.0596 A  |
| Power        | 6.71 W    |
| Frequency    | 60.00 Hz  |
| Power Factor | 0.938     |
| Current THD  | 10.0 %    |



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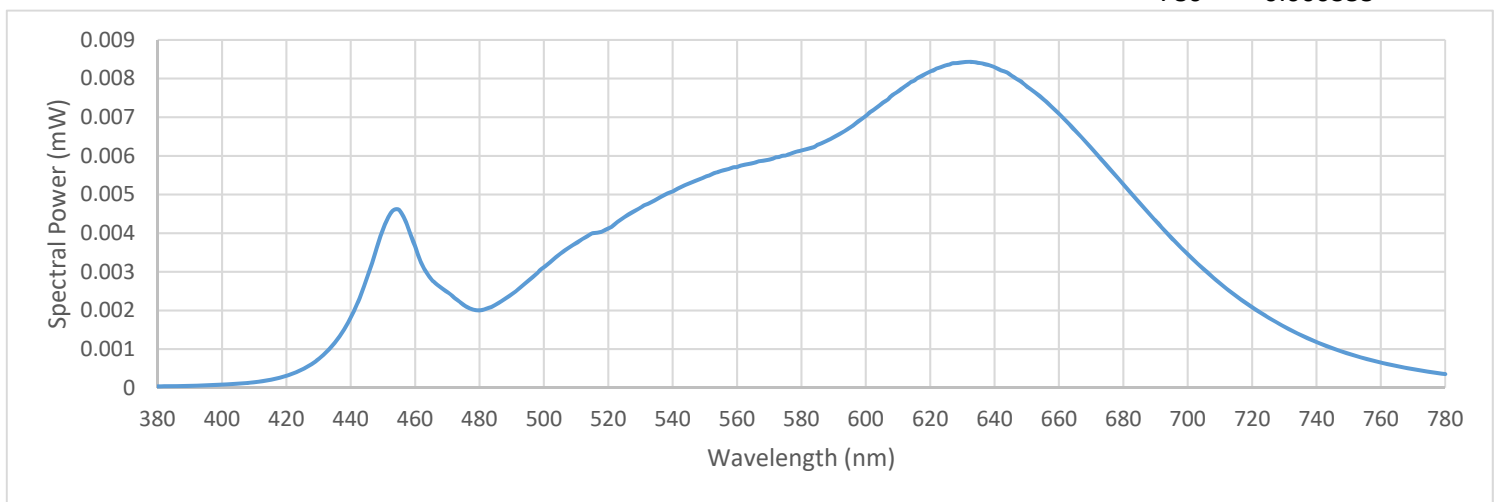
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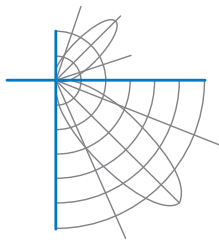
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One L.T.F. DA6W150C2040LP010-0014 dimmable LED driver

Summary Spectral Power Distribution (wavelength - nm, spectral power - mW)

|     |          |     |          |     |          |     |          |
|-----|----------|-----|----------|-----|----------|-----|----------|
| 380 | 0.000037 | 480 | 0.002004 | 580 | 0.006140 | 680 | 0.005263 |
| 385 | 0.000040 | 485 | 0.002152 | 585 | 0.006286 | 685 | 0.004795 |
| 390 | 0.000050 | 490 | 0.002418 | 590 | 0.006481 | 690 | 0.004326 |
| 395 | 0.000063 | 495 | 0.002751 | 595 | 0.006724 | 695 | 0.003869 |
| 400 | 0.000081 | 500 | 0.003121 | 600 | 0.007028 | 700 | 0.003458 |
| 405 | 0.000106 | 505 | 0.003458 | 605 | 0.007359 | 705 | 0.003069 |
| 410 | 0.000145 | 510 | 0.003738 | 610 | 0.007665 | 710 | 0.002696 |
| 415 | 0.000204 | 515 | 0.003996 | 615 | 0.007947 | 715 | 0.002378 |
| 420 | 0.000310 | 520 | 0.004126 | 620 | 0.008185 | 720 | 0.002081 |
| 425 | 0.000477 | 525 | 0.004412 | 625 | 0.008343 | 725 | 0.001817 |
| 430 | 0.000746 | 530 | 0.004654 | 630 | 0.008422 | 730 | 0.001584 |
| 435 | 0.001166 | 535 | 0.004876 | 635 | 0.008404 | 735 | 0.001368 |
| 440 | 0.001818 | 540 | 0.005079 | 640 | 0.008297 | 740 | 0.001181 |
| 445 | 0.002834 | 545 | 0.005281 | 645 | 0.008091 | 745 | 0.001021 |
| 450 | 0.004103 | 550 | 0.005454 | 650 | 0.007797 | 750 | 0.000878 |
| 455 | 0.004603 | 555 | 0.005607 | 655 | 0.007473 | 755 | 0.000755 |
| 460 | 0.003662 | 560 | 0.005712 | 660 | 0.007097 | 760 | 0.000654 |
| 465 | 0.002806 | 565 | 0.005812 | 665 | 0.006656 | 765 | 0.000562 |
| 470 | 0.002476 | 570 | 0.005902 | 670 | 0.006205 | 770 | 0.000480 |
| 475 | 0.002143 | 575 | 0.006008 | 675 | 0.005743 | 775 | 0.000414 |
|     |          |     |          |     |          | 780 | 0.000355 |





**Test Report Number: LLIA000824-039B**

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translucent white glass enclosure.

12 white LEDs, one Harvard Engineering LEDENG-163-930 LED board

One L.T.F. DA6W150C2040LP010-0014 dimmable LED driver

|                               |  |
|-------------------------------|--|
| Test Equipment Configuration: | LightLab International Allentown 2m Integrating Sphere<br>Measurements acquired using a Labsphere CDS 2600 spectroradiometer<br>Testing was performed using 4 $\pi$ geometry   |
| Test Temperature:             | 24.5 °C  |
| Test Procedure:               | Tested in accordance with the applicable sections of:<br>LM-79-08, LM-78-07, LM-58-13, ANSI_ANSLG C78.377-2015, ANSI C82-77-10:2014  |
| Significance:                 | The laboratory has not participated in the selection of samples to be tested.<br>All testing is performed on the understanding that the significance of the report<br>is limited to the extent that the test sample is representative of production units.   |
| Notes:                        | The measurements and other derived quantities contained in this report<br>are based on the absolute data as measured.<br><br>Prorating the performance of the sample for the use of other component<br>combinations (such as lamp / LED / Ballast / driver), or for use in different<br>environmental conditions than that tested, may produce erroneous results.<br><br>This report is free of erasures and corrections<br><br>This report may contain data that are not covered by the NVLAP accreditation.<br>Quantities marked with * are not covered. |