# Test Report

Report Number: L17024 Date: Jun 16, 2017

Issued by:
Dialight Optics Laboratory
1501 Route 34 South, Farmingdale, NJ 07727

Test of one Vigilant Area Light
Unit manufacturer: Dialight Corporation
Unit model number: ALU5AC23-xxxxx-N

Issued to:
Dialight Corporation
1501 Route 34 South, Farmingdale, NJ 07727

**Tests performed:** Photometric characterization and temperature measurement per the described standards.

**Dates of test:** June 7, 2017 through June 16, 2017

**Standards used:** All tests are performed in accordance with procedures and guidelines prescribed by the American National Standards Institute (ANSI) or Illuminating Engineering Society of North America (IES):

- IES LM-79:2008: Electrical and Photometric Measurements of Solid-State Lighting Products
- ANSI/UL 1598:2008: Underwriters Laboratories Inc. Standard for Safety: Luminaires
- ENERGY STAR Manufacturer's Guide for Qualifying Solid State Lighting Luminaires Version 2.1

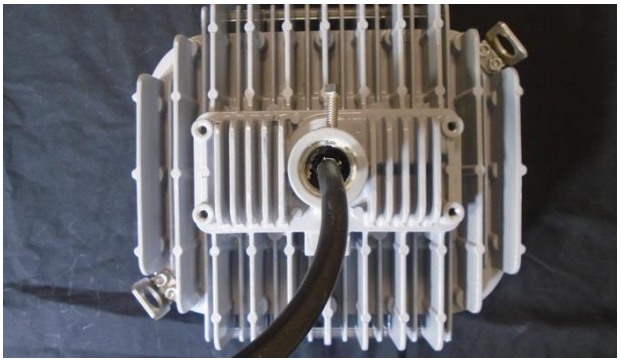
**Description of sample:**

| | |
|---|---|
| Sample Number: | L17024 |
| Manufacturer: | Dialight Corporation |
| Product Name: | Vigilant Area Light |
| Description: | Vigilant Area Light |
| Model Number: | ALU5AC23-xxxxx-N |

# Report Summary

Sample number L17024
Dialight unit model number ALU5AC23-xxxxx-N

**Photograph(s) of sample:**



*Photographs not to scale. For reference only.

**Summary of Results:**

| | Integrating Sphere | | Goniophotometer | |
|---|---|---|---|---|
| Luminous Flux: | 2783 | (lumens) | 2688 | (lumens) |
| Electrical Power: | 23.5 | (W) | 23.5 | (W) |
| Luminous Efficacy: | 118.7 | (lumens/W) | 114.6 | (lumens/W) |

**Electrical Measurements:**

| | | |
|---|---|---|
| Input Power (120VAC): | 23.5 | (W) |
| Power Factor (120VAC): | 0.992 | |
| Current ATHD % (120VAC): | 7.411 | |
| Input Power (277VAC): | 23.3 | (W) |
| Power Factor (277VAC): | 0.925 | |
| Current ATHD % (277VAC): | 16.55 | |

**Color Measurements:**

| | |
|---|---|
| Correlated Color Temperature (CCT): | 4828 |
| Color Rendering Index (CRI): | 82.7 |
| Chromaticity Coordinate (x): | 0.351 |
| Chromaticity Coordinate (y): | 0.363 |
| Chromaticity Coordinate (u'): | 0.211 |
| Chromaticity Coordinate (v'): | 0.327 |
| DUV: | 0.0032 |

**Temperature Measurements:**

| | | |
|---|---|---|
| In Situ LED Source Temperature: | 36.9 | (°C) |

# Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L17024.
Dialight unit model number ALU5AC23-xxxxx-N

**Test Conditions:**

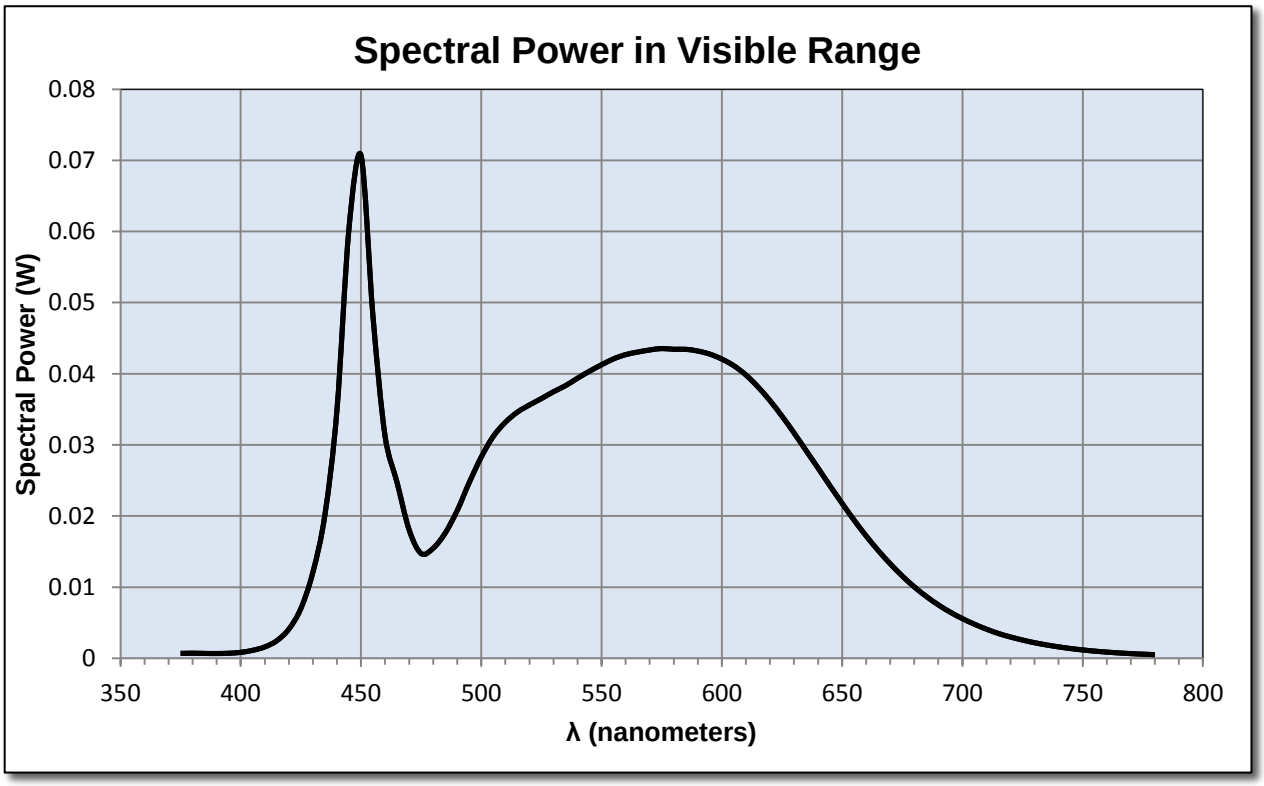
| | | |
|---|---|---|
| Ambient Temperature: | 25 ± 1 | (°C) |

**Electrical Measurements:**

| | | |
|---|---|---|
| Input Voltage: | 120 | (VAC) |
| Input Current: | 0.197 | (A) |
| Input Power: | 23.5 | (W) |
| Input Power Factor: | 0.992 | |
| Current ATHD: | 7.411 | (%) |

**Photometric measurements:**

| | | |
|---|---|---|
| Luminous Flux: | 2783 | (lumens) |
| Luminous Efficacy: | 118.7 | (lumens/W) |
| Correlated Color Temperature (CCT): | 4828 | (K) |
| CRI -Ra: | 82.7 | |
| CRI -R9: | 10 | |
| DUV: | 0.0032 | |
| CIE Coordinate (x): | 0.351 | |
| CIE Coordinate (y): | 0.363 | |
| CIE Coordinate (u'): | 0.211 | |
| CIE Coordinate (v'): | 0.327 | |



# Test Results: Integrating Sphere

Results continued from previous page.

**Tabulated Spectral Power in Visible Range:**

| λ(nm) | (W/nm) | λ(nm) | (W/nm) | λ(nm) | (W/nm) |
|---|---|---|---|---|---|
| 375 | 0.001 | 515 | 0.035 | 655 | 0.019 |
| 380 | 0.001 | 520 | 0.036 | 660 | 0.017 |
| 385 | 0.001 | 525 | 0.037 | 665 | 0.015 |
| 390 | 0.001 | 530 | 0.037 | 670 | 0.013 |
| 395 | 0.001 | 535 | 0.038 | 675 | 0.012 |
| 400 | 0.001 | 540 | 0.039 | 680 | 0.010 |
| 405 | 0.001 | 545 | 0.040 | 685 | 0.009 |
| 410 | 0.002 | 550 | 0.041 | 690 | 0.008 |
| 415 | 0.002 | 555 | 0.042 | 695 | 0.006 |
| 420 | 0.004 | 560 | 0.043 | 700 | 0.006 |
| 425 | 0.007 | 565 | 0.043 | 705 | 0.005 |
| 430 | 0.012 | 570 | 0.043 | 710 | 0.004 |
| 435 | 0.020 | 575 | 0.044 | 715 | 0.003 |
| 440 | 0.035 | 580 | 0.043 | 720 | 0.003 |
| 445 | 0.060 | 585 | 0.043 | 725 | 0.003 |
| 450 | 0.071 | 590 | 0.043 | 730 | 0.002 |
| 455 | 0.048 | 595 | 0.043 | 735 | 0.002 |
| 460 | 0.031 | 600 | 0.042 | 740 | 0.002 |
| 465 | 0.025 | 605 | 0.041 | 745 | 0.001 |
| 470 | 0.018 | 610 | 0.040 | 750 | 0.001 |
| 475 | 0.015 | 615 | 0.038 | 755 | 0.001 |
| 480 | 0.015 | 620 | 0.036 | 760 | 0.001 |
| 485 | 0.018 | 625 | 0.034 | 765 | 0.001 |
| 490 | 0.021 | 630 | 0.032 | 770 | 0.001 |
| 495 | 0.025 | 635 | 0.029 | 775 | 0.001 |
| 500 | 0.028 | 640 | 0.027 | 780 | 0.001 |
| 505 | 0.031 | 645 | 0.024 | | |
| 510 | 0.033 | 650 | 0.022 | | |

Dialight OPTICS LABORATORY

NVLAP TESTING NVLAP LAB CODE 201033-0

# Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L17024.
Dialight unit model number ALU5AC23-xxxxx-N

**Electrical Measurements:**

| | | |
|---|---|---|
| Input Voltage: | 120 | (VAC) |
| Input current: | 0.197 | (A) |
| Input Power: | 23.5 | (W) |
| Power Factor: | 0.991 | |

**Photometric measurements:**

| | | |
|---|---|---|
| Absolute Luminous Flux: | 2688 | (lumens) |
| Luminous Efficacy: | 114.6 | (lumens/W) |

**Intensity Summary:**

**INTENSITY (CANDLEPOWER) SUMMARY**

| ANGLE | ALONG | 25 | 45 | 72.5 | ACROSS | OUTPUT LUMENS |
|---|---|---|---|---|---|---|
| 0 | 1278 | 1278 | 1278 | 1278 | 1278 | |
| 5 | 1290 | 1287 | 1286 | 1286 | 1282 | 47 |
| 15 | 1344 | 1327 | 1299 | 1272 | 1247 | 261 |
| 25 | 1442 | 1395 | 1313 | 1192 | 1132 | 431 |
| 35 | 1396 | 1374 | 1297 | 1091 | 983 | 516 |
| 45 | 1031 | 1086 | 1155 | 995 | 823 | 523 |
| 55 | 457 | 576 | 791 | 875 | 694 | 440 |
| 65 | 93 | 134 | 303 | 679 | 497 | 294 |
| 75 | 36 | 38 | 54 | 191 | 237 | 130 |
| 85 | 16 | 16 | 18 | 31 | 47 | 40 |
| 95 | 0 | 0 | 0 | 0 | 0 | 5 |
| 105 | 0 | 0 | 0 | 0 | 0 | 0 |
| 115 | 0 | 0 | 0 | 0 | 0 | 0 |
| 125 | 0 | 0 | 0 | 0 | 0 | 0 |
| 135 | 0 | 0 | 0 | 0 | 0 | 0 |
| 145 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155 | 0 | 0 | 0 | 0 | 0 | 0 |
| 165 | 0 | 0 | 0 | 0 | 0 | 0 |
| 175 | 0 | 0 | 0 | 0 | 0 | 0 |
| 180 | 0 | 0 | 0 | 0 | 0 | |

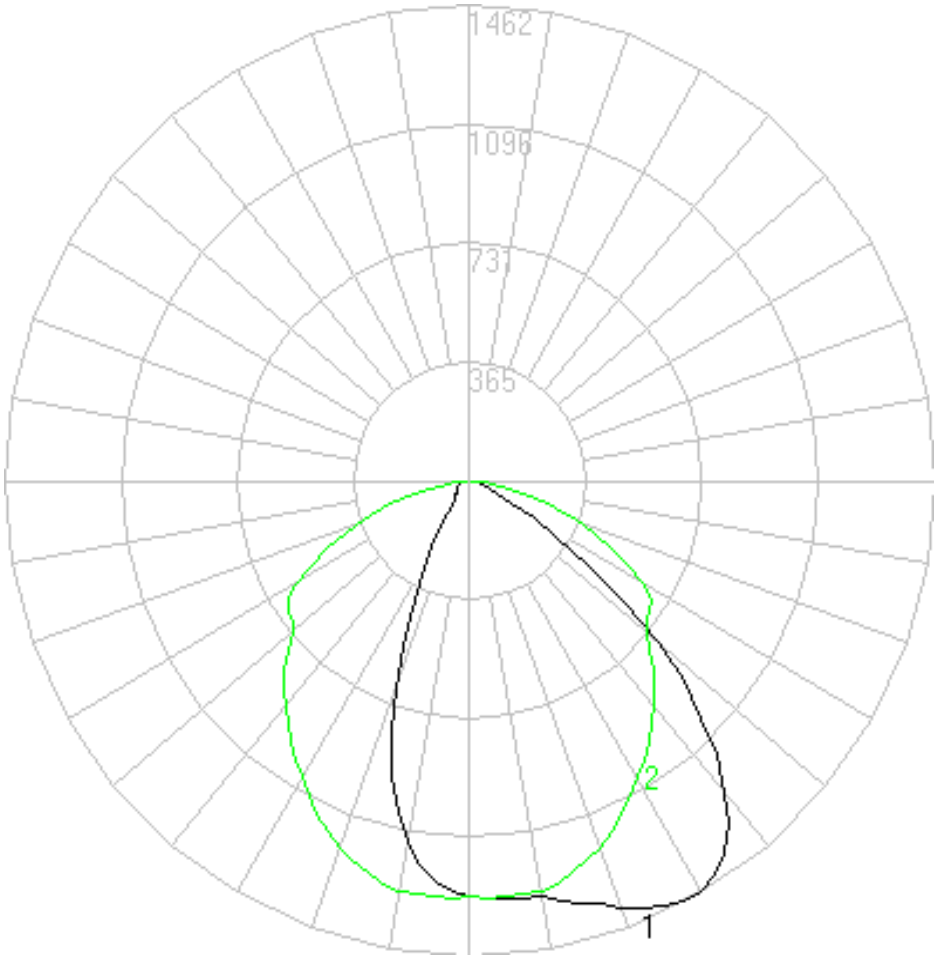
**ZONAL LUMEN AND PERCENTAGES**

| ZONE | LUMENS | % LUMINAIRE |
|---|---|---|
| 0-30 | 992.52 | 36.9% |
| 0-40 | 1522.03 | 56.6% |
| 0-60 | 2388.11 | 88.9% |
| 60-90 | 379.47 | 14.1% |
| 0-90 | 2687.79 | 100.0% |
| 90-180 | 0 | 0.0% |
| 0-180 | 2687.79 | 100.0% |

# Test Results: Goniometer

Results continued from previous page.

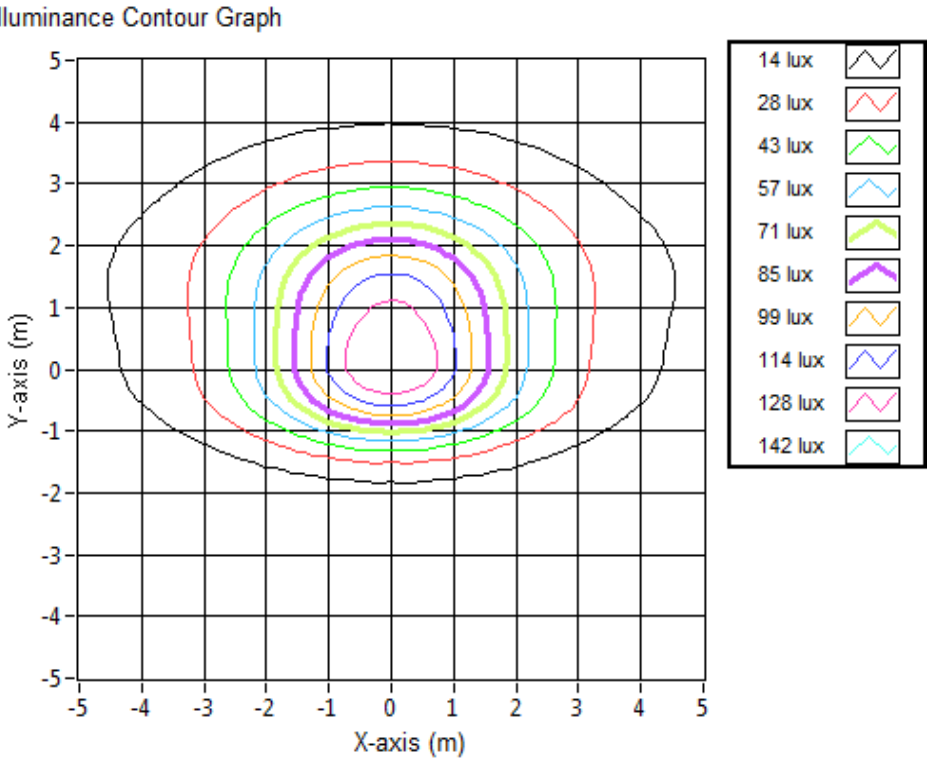
**Polar Plot:**



# Test Results: Goniometer

Results continued from previous page.

**Illuminance Plot:**




**Illuminance-Cone of Light:**

| Mounting Height (m) | Beam Cone Width (m) | Orthogonal Beam Cone Width (m) | Projected Illuminance (lux) |
|---|---|---|---|
| 3.048 | 5.07 | 10.39 | 137.6 |
| 6.096 | 10.14 | 20.79 | 34.4 |
| 9.144 | 15.21 | 31.18 | 15.3 |
| 12.192 | 20.28 | 41.58 | 8.6 |
| 15.24 | 25.35 | 51.97 | 5.5 |
| 18.288 | 30.42 | 62.37 | 3.8 |
| 21.336 | 35.50 | 72.76 | 2.8 |
| 24.384 | 40.57 | 83.16 | 2.2 |
| 27.432 | 45.64 | 93.55 | 1.7 |
| 30.48 | 50.71 | 103.95 | 1.4 |

# Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L17024.
Dialight unit model number ALU5AC23-xxxxx-N

LED identified as Seoul part number SAW8C22B.

| | | |
|---|---|---|
| LED drive current (as indicated by customer): | 39 | (mA) |

**LED Specifications:**

LED specifications are taken from LED manufacturer datasheet:

| | | |
|---|---|---|
| Maximum Forward Current (If): | 250 | (mA) |
| Maximum Rated Power Dissipation: | 1.5 | (W) |
| Maximum Junction Temp. (Tj): | 125 | (°C) |
| Thermal Resistance (Rth): | 17 | (°C/W) |

Derived Specifications:

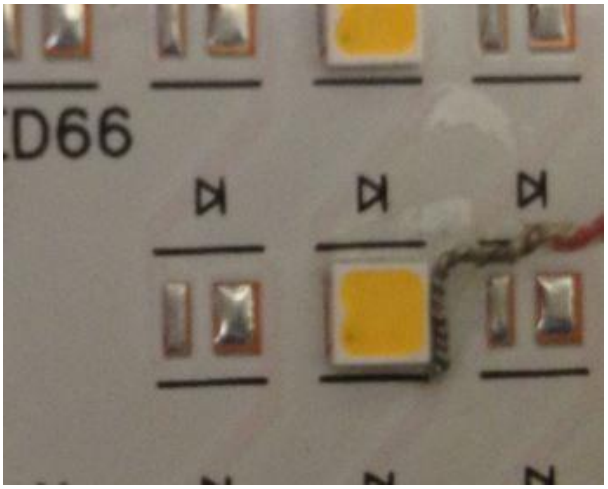
| | | |
|---|---|---|
| Maximum Power at Indicated Current: | 0.234 | (W) |
| Maximum Source Temperature: | 121 | (°C) |

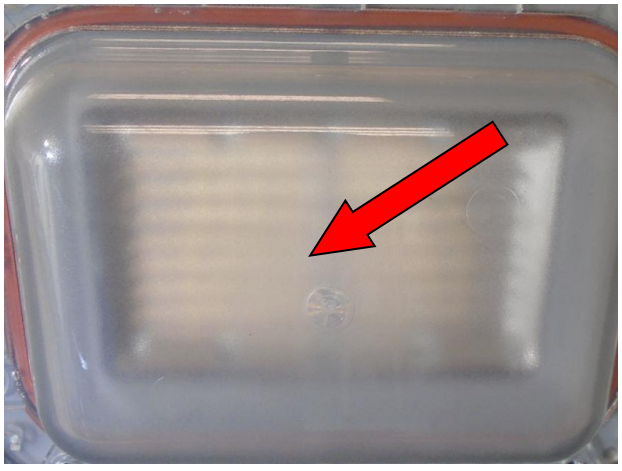
**Test Conditions:**

| | | |
|---|---|---|
| Temperature Measurement Location: | See Photographs Below | |
| Ambient Temperature: | 25° ± 5‘ | (°C) |
| Ambient temperature at time of measurement: | 23 | (°C) |
| Relative humidity at time of measurement: | 23% | |

**Results:**

| | | |
|---|---|---|
| **Measured LED source temperature:** | 36.9 | (°C) |



**Equipment Used:**

| Equipment Name | Model Number |
|---|---|
| Omega TC | Dpi8 |
| Fluke 8808A Digit Multimeter | 8808A |
| YOKOGAWA Digital Power Meter | 11/26/3981 |
| LSI High Speed Mirror Goniometer | 6240T |
| Instrument System Spectrometer | CAS140B-151 |
| Instrument System 1.5 Meter Sphere | ISP1500 |
| Delta Elektronika DC Power Supply | SM.300-5 |
| Instek AC Power Supply | APS-9501 |
| Sorensen DC Power Supply | XHR150-7 |
| Extech Hygro-Thermometer | 4/16/3120 |
| Extech Hygro-Thermometer | 4/16/3120 |
| Fluke 971 Humidity Meter | 971 |
| Volttech Power Analyzer | PM1000+ |
| Volttech Universal Breakout Box | PM1000+ |
| Dialight Golden Sample | HB1N4N |
| Step-Up Transformer | |
| Omega TC | Dpi8-C24 |
| Agilent True RMS OLED Multimeter | U1273A |
| ITL Osram Calibraton lamps for Goniometer | J9a8 |
| ITL Osram Calibraton lamps for Goniometer | J9a8 |
| ITL Osram Calibraton lamps for Goniometer | J9a8 |
| Adaptive Power Systems AC Power Supply | FC-210 |
| Xitron Power Analyzer | XT2640 |
| | |
| | |

**Additional Notes:**

Samples are received and tested in new and undamaged condition, unless otherwise noted.
The results shown in this report are representative only of the test samples submitted. This data has been issued to the assignee for further evaluation.
This report shall not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.


Test Report Issued By:

Richard Huegi
Dialight Optics Laboratory
Senior Optical Engineering Technician
Lighting Division

Test Report Reviewed and Approved By:

Vishnu Shastry
Dialight Optics Laboratory
Optical Engineer
Approved Signatory