

# Test Report

Report Number: L18085

Date: Oct 4, 2018

Issued by:

Dialight Optics Laboratory  
1501 Route 34 South, Farmingdale, NJ 07727

Test of one Linear

Unit manufacturer: Dialight Corporation  
Unit model number: LGx4MW23xxxxN

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:** September 28, 2018 through October 3, 2018

**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

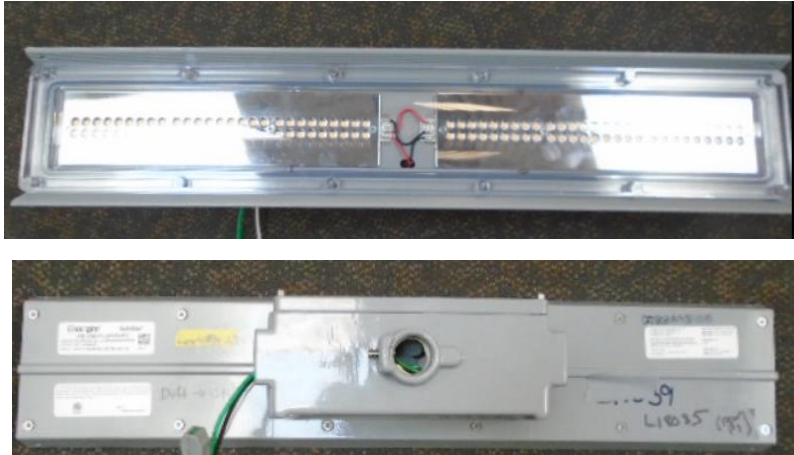
**Description of sample:**

Sample Number: L18085  
Manufacturer: Dialight Corporation  
Product Name: 2ft Linear  
Description: Linear  
Model Number: LGx4MW23xxxxN

## Report Summary

Sample number L18085  
Dialight unit model number LGx4MW23xxxxN

### Photograph(s) of sample:



\*Photographs not to scale. For reference only.

### Summary of Results:

|                    | <u>Integrating Sphere</u> | <u>Goniophotometer</u> |
|--------------------|---------------------------|------------------------|
| Luminous Flux:     | 2796 (lumens)             | 2783 (lumens)          |
| Electrical Power:  | 22.8 (W)                  | 22.8 (W)               |
| Luminous Efficacy: | 122.7 (lumens/W)          | 121.8 (lumens/W)       |

### Electrical Measurements:

Input Power (277VAC): 22.8 (W)  
 Power Factor (277VAC): 0.992  
 Current ATHD % (277VAC): 6.179  
 Input Power (120VAC): 22.7 (W)  
 Power Factor (120VAC): 0.908  
 Current ATHD % (120VAC): 16.46

### Color Measurements:

Correlated Color Temperature (CCT): 2725  
 Color Rendering Index (CRI): 86.3  
 Chromaticity Coordinate (x): 0.453  
 Chromaticity Coordinate (y): 0.401  
 Chromaticity Coordinate (u'): 0.262  
 Chromaticity Coordinate (v'): 0.348  
 DUV: 0.0031

### Temperature Measurements:

In Situ LED Source Temperature: 37.9 (°C)

## Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L18085.

Dialight unit model number LGx4MW23xxxxxN

### Test Conditions:

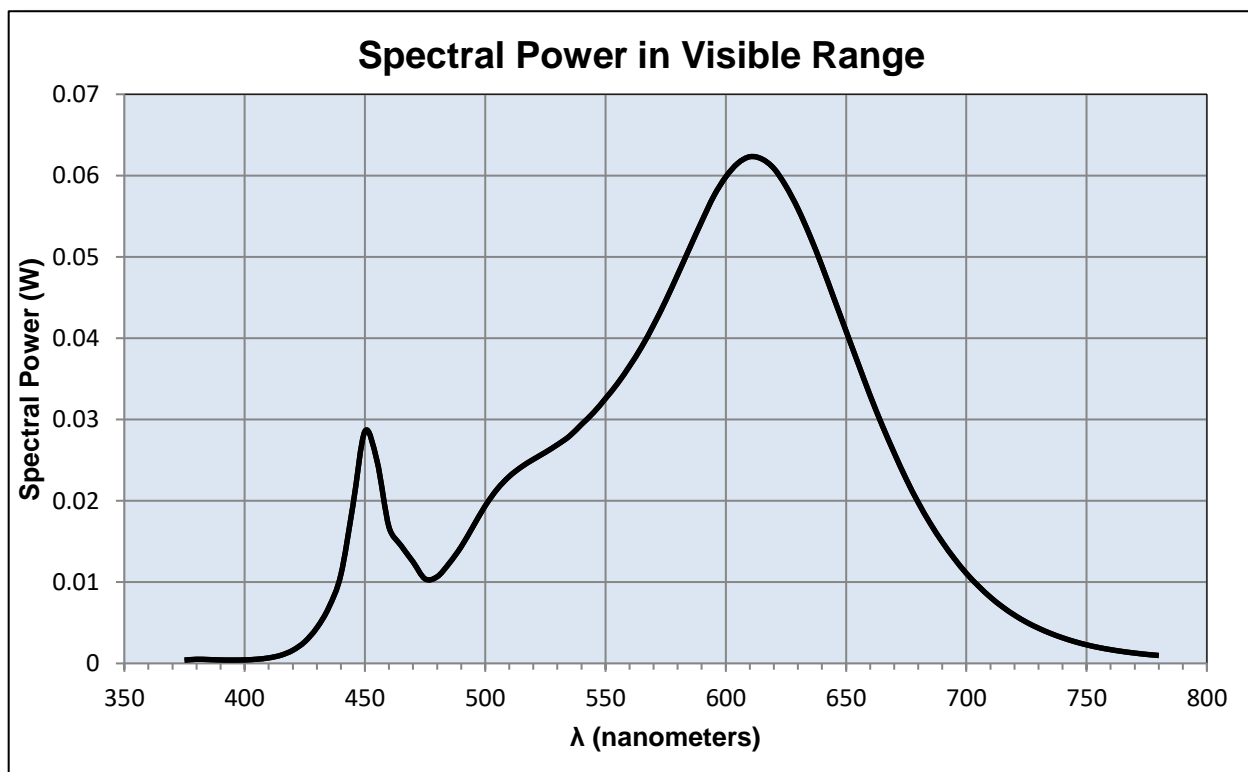
Ambient Temperature:  $25 \pm 1$  (°C)

### Electrical Measurements:

Input Voltage: 120 (VAC)  
 Input Current: 0.192 (A)  
 Input Power: 22.8 (W)  
 Input Power Factor: 0.992  
 Current ATHD: 6.179 (%)

### Photometric measurements:

Luminous Flux: 2796 (lumens)  
 Luminous Efficacy: 122.7 (lumens/W)  
 Correlated Color Temperature (CCT): 2725 (K)  
 CRI -Ra: 86.3  
 CRI -R9: 23.6  
 DUV: 0.0031  
 CIE Coordinate (x): 0.453  
 CIE Coordinate (y): 0.401  
 CIE Coordinate (u'): 0.262  
 CIE Coordinate (v'): 0.348



## Test Results: Integrating Sphere

Results continued from previous page.

### Tabulated Spectral Power in Visible Range:

| $\lambda(\text{nm})$ | (W/nm) | $\lambda(\text{nm})$ | (W/nm) | $\lambda(\text{nm})$ | (W/nm) |
|----------------------|--------|----------------------|--------|----------------------|--------|
| 375                  | 0.000  | 515                  | 0.024  | 655                  | 0.037  |
| 380                  | 0.001  | 520                  | 0.025  | 660                  | 0.033  |
| 385                  | 0.000  | 525                  | 0.026  | 665                  | 0.029  |
| 390                  | 0.000  | 530                  | 0.027  | 670                  | 0.026  |
| 395                  | 0.000  | 535                  | 0.028  | 675                  | 0.023  |
| 400                  | 0.000  | 540                  | 0.029  | 680                  | 0.020  |
| 405                  | 0.001  | 545                  | 0.031  | 685                  | 0.017  |
| 410                  | 0.001  | 550                  | 0.033  | 690                  | 0.015  |
| 415                  | 0.001  | 555                  | 0.034  | 695                  | 0.013  |
| 420                  | 0.002  | 560                  | 0.037  | 700                  | 0.011  |
| 425                  | 0.003  | 565                  | 0.039  | 705                  | 0.010  |
| 430                  | 0.004  | 570                  | 0.042  | 710                  | 0.008  |
| 435                  | 0.007  | 575                  | 0.045  | 715                  | 0.007  |
| 440                  | 0.011  | 580                  | 0.048  | 720                  | 0.006  |
| 445                  | 0.019  | 585                  | 0.051  | 725                  | 0.005  |
| 450                  | 0.029  | 590                  | 0.054  | 730                  | 0.004  |
| 455                  | 0.025  | 595                  | 0.057  | 735                  | 0.004  |
| 460                  | 0.017  | 600                  | 0.060  | 740                  | 0.003  |
| 465                  | 0.015  | 605                  | 0.062  | 745                  | 0.003  |
| 470                  | 0.012  | 610                  | 0.062  | 750                  | 0.002  |
| 475                  | 0.010  | 615                  | 0.062  | 755                  | 0.002  |
| 480                  | 0.011  | 620                  | 0.061  | 760                  | 0.002  |
| 485                  | 0.012  | 625                  | 0.059  | 765                  | 0.001  |
| 490                  | 0.014  | 630                  | 0.056  | 770                  | 0.001  |
| 495                  | 0.017  | 635                  | 0.053  | 775                  | 0.001  |
| 500                  | 0.019  | 640                  | 0.049  | 780                  | 0.001  |
| 505                  | 0.021  | 645                  | 0.045  |                      |        |
| 510                  | 0.023  | 650                  | 0.041  |                      |        |

## Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L18085.  
Dialight unit model number LGx4MW23xxxxxN

### Electrical Measurements:

Input Voltage: 120 (VAC)  
Input current: 0.192 (A)  
Input Power: 22.8 (W)  
Power Factor: 0.988

### Photometric measurements:

Absolute Luminous Flux: 2783 (lumens)  
Luminous Efficacy: 121.8 (lumens/W)

### Intensity Summary:

| <u>INTENSITY (CANDLEPOWER) SUMMARY</u> |       |      |      |      |        |               |
|--|-------|------|------|------|--------|---------------|
| ANGLE                                  | ALONG | 23   | 45   | 67.5 | ACROSS | OUTPUT LUMENS |
| 0                                      | 1224  | 1224 | 1224 | 1224 | 1224   |               |
| 5                                      | 1225  | 1225 | 1225 | 1225 | 1225   | 46            |
| 15                                     | 1175  | 1175 | 1175 | 1175 | 1175   | 255           |
| 25                                     | 1117  | 1117 | 1117 | 1117 | 1117   | 451           |
| 35                                     | 1021  | 1021 | 1021 | 1021 | 1021   | 617           |
| 45                                     | 692   | 692  | 692  | 692  | 692    | 566           |
| 55                                     | 514   | 514  | 514  | 514  | 514    | 490           |
| 65                                     | 188   | 188  | 188  | 188  | 188    | 324           |
| 75                                     | 9     | 9    | 9    | 9    | 9      | 32            |
| 85                                     | 0     | 0    | 0    | 0    | 0      | 2             |
| 95                                     | 0     | 0    | 0    | 0    | 0      | 0             |
| 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      | 0             |

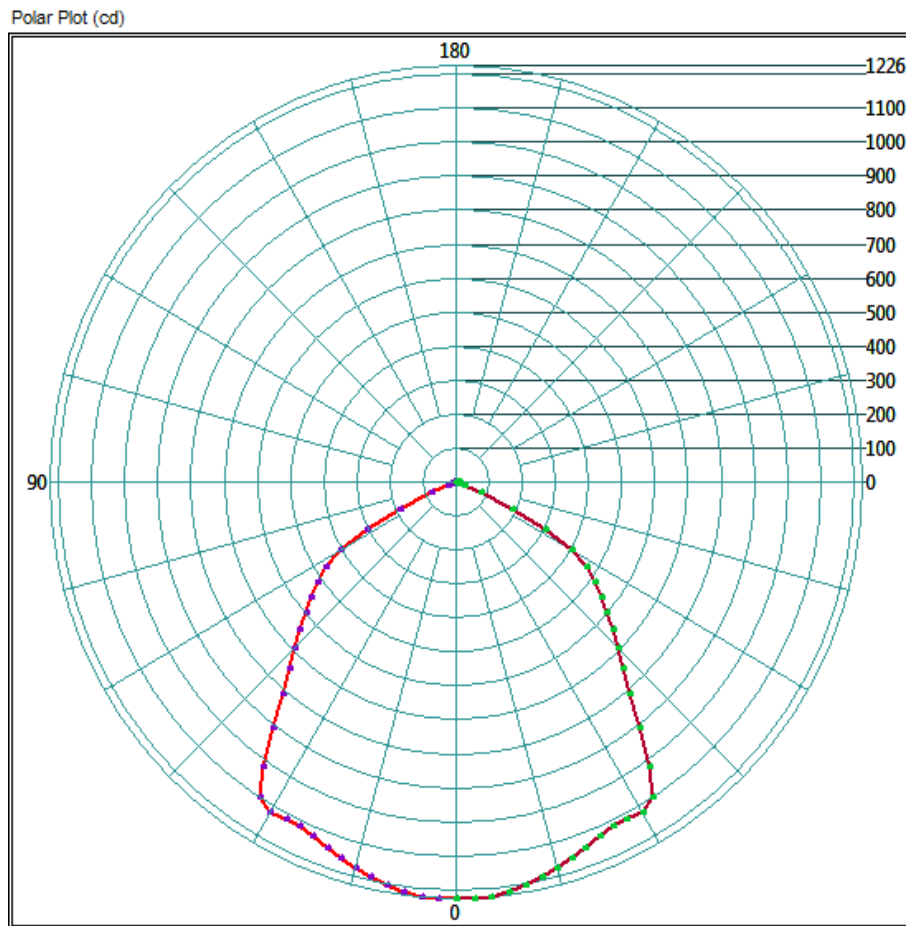
### ZONAL LUMEN AND PERCENTAGES

| ZONE   | LUMENS  | % LUMINAIRE |
|--------|---------|-------------|
| 0-30   | 1046.08 | 37.6%       |
| 0-40   | 1663.04 | 59.8%       |
| 0-60   | 2627.52 | 94.4%       |
| 60-90  | 250.24  | 9.0%        |
| 0-90   | 2782.72 | 100.0%      |
| 90-180 | 0       | 0.0%        |
| 0-180  | 2782.72 | 100.0%      |

## Test Results: Goniometer

Results continued from previous page.

### Polar Plot:

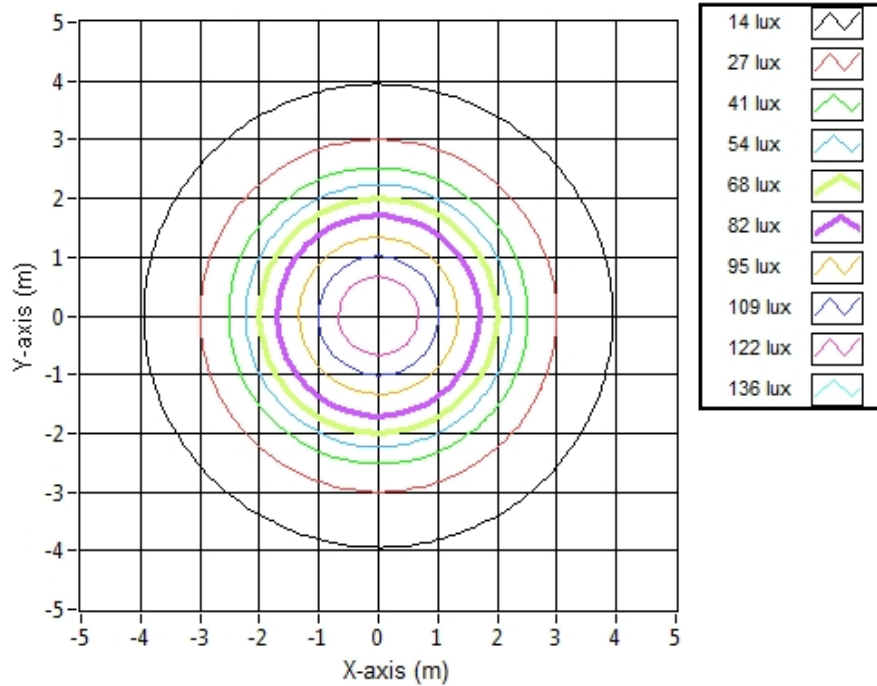


## Test Results: Goniometer

Results continued from previous page.

### Illuminance Plot:

Illuminance Contour Graph



### Illuminance-Cone of Light:

| Mounting Height (m) | Beam Cone Width (m) | Orthogonal Beam Cone Width (m) | Projected Illuminance (lux) |
|---------------------|---------------------|--------------------------------|-----------------------------|
| 3.048               | 7.02                | 7.02                           | 131.7                       |
| 6.096               | 14.05               | 14.05                          | 32.9                        |
| 9.144               | 21.07               | 21.07                          | 14.6                        |
| 12.192              | 28.09               | 28.09                          | 8.2                         |
| 15.24               | 35.11               | 35.11                          | 5.3                         |
| 18.288              | 42.14               | 42.14                          | 3.7                         |
| 21.336              | 49.16               | 49.16                          | 2.7                         |
| 24.384              | 56.18               | 56.18                          | 2.1                         |
| 27.432              | 63.20               | 63.20                          | 1.6                         |
| 30.48               | 70.23               | 70.23                          | 1.3                         |

## Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L18085.  
Dialight unit model number LGx4MW23xxxxxN

LED identified as Seoul part number SAW8C22B.

LED drive current (as indicated by customer): 40 (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:

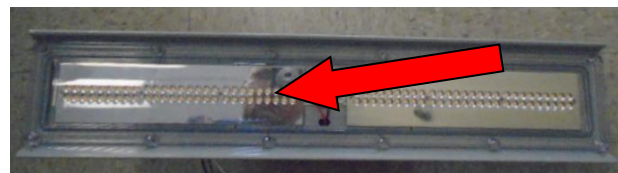
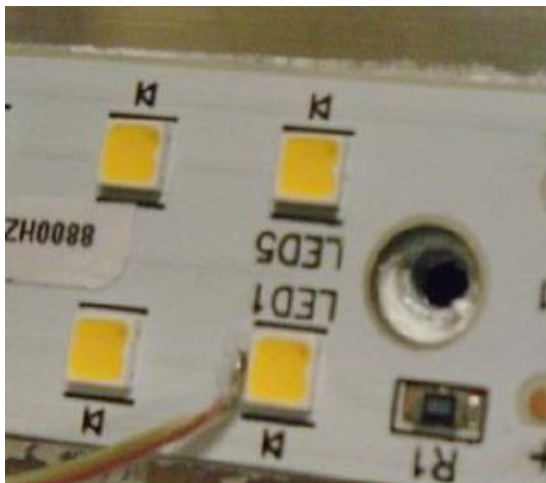
Maximum Power at Indicated Current: 0.24 (W)  
Maximum Source Temperature: 120.9 (°C)

### Test Conditions:

Temperature Measurement Location: See Photographs Below  
Ambient Temperature:  $25^{\circ} \pm 5^{\circ}$  (°C)  
Ambient temperature at time of measurement: 24.9 (°C)  
Relative humidity at time of measurement: 39%

### Results:

**Measured LED source temperature: 37.9 (°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     |
| TPI Digital Thermometer                    | TPI 343      |
| Fluke 52II Thermometer                     | 068158       |
| Fluke 971 Humidity Meter                   | 971          |
| Volttech Power Analyzer                    | PM1000+      |
| Volttech Universal Breakout Box            | PM1000+      |
| BK Precision                               | 1715A        |
| 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       |
| GwINSTEK DC Power Supply                   | GEP172679    |
| Osram Sylvania Calibration Lamp for Sphere | STD-20WF-3   |

**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. This report shall not be reproduced, except in full, without the express written permission of Dialight Optics Laboratory.

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