

# Test Report

Report Number: L20088

Date: Nov 30, 2020

Issued by:

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

Test of one Highbay

Unit manufacturer: Dialight Corporation

Unit model number: H[C,E,F,W][D,U]-[L,Z]EN-[2,8]Ex-xxx-xx

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:** November 17, 2020 through November 18, 2020

**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: L20088

Manufacturer: Dialight Corporation

Product Name: Highbay

Description: Highbay

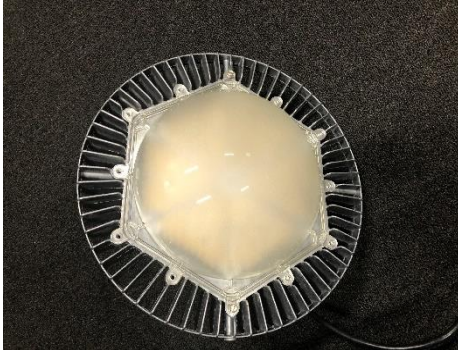
Model Number: H[C,E,F,W][D,U]-[L,Z]EN-[2,8]Ex-xxx-xx

## Report Summary

Sample number L20088

Dialight unit model number H[C,E,F,W][D,U]-[L,Z]EN-[2,8]Ex-xxx-xx

### Photograph(s) of sample:



\*Photographs not to scale. For reference only.

### Summary of Results:

|                    | <u>Integrating Sphere</u> | <u>Goniophotometer</u> |
|--------------------|---------------------------|------------------------|
| Luminous Flux:     | 25158 (lumens)            | 24669 (lumens)         |
| Electrical Power:  | 184.6 (W)                 | 183.0 (W)              |
| Luminous Efficacy: | 136.3 (lumens/W)          | 134.8 (lumens/W)       |

### Electrical Measurements:

Input Power (120VAC): 184.6 (W)  
Power Factor (120VAC): 0.995625  
Current ATHD % (120VAC): 5.04071  
Input Power (277VAC): 178.4 (W)  
Power Factor (277VAC): 0.9556  
Current ATHD % (277VAC): 9.65

### Color Measurements:

Correlated Color Temperature (CCT): 3979  
Color Rendering Index (CRI): 83.408  
Chromaticity Coordinate (x): 0.383  
Chromaticity Coordinate (y): 0.383  
Chromaticity Coordinate (u'): 0.224  
Chromaticity Coordinate (v'): 0.336  
DUV: 0.0021

### Temperature Measurements:

In Situ LED Source Temperature: 59.6 (°C)

## Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L20088.

Dialight unit model number H[C,E,F,W][D,U]-[L,Z]EN-[2,8]Ex-xxx-xx

### Test Conditions:

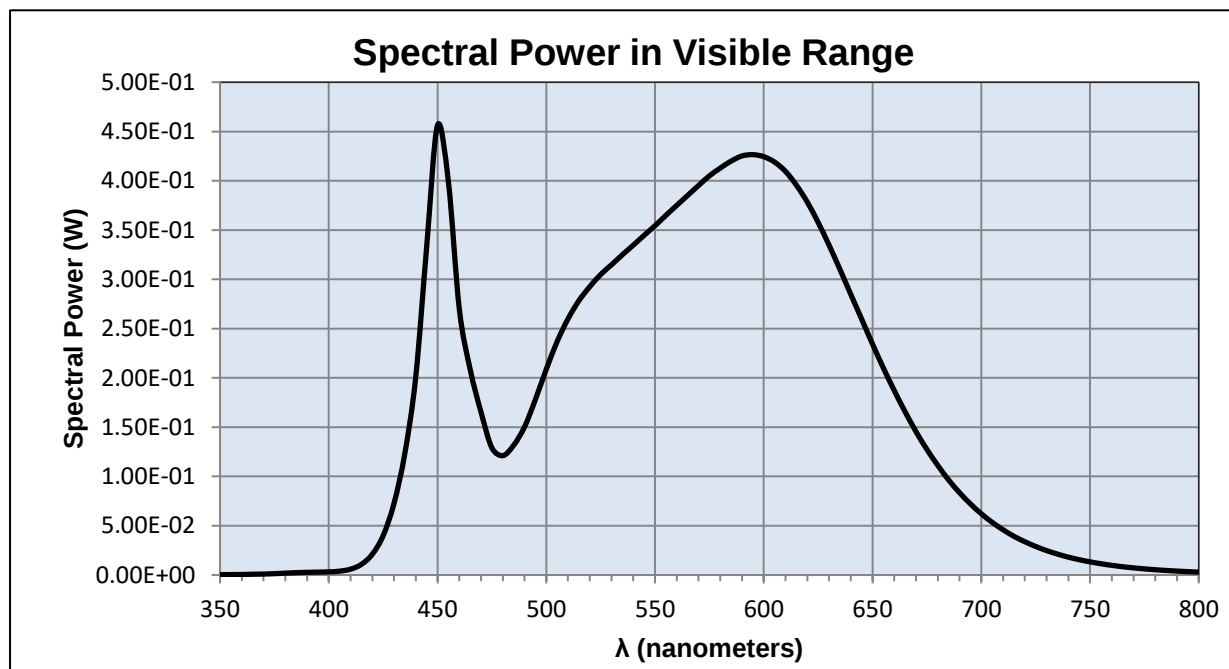
Ambient Temperature:  $25 \pm 1$  (°C)

### Electrical Measurements:

Input Voltage: 119.641 (VAC)  
Input Current: 1.54939 (A)  
Input Power: 184.6 (W)  
Input Power Factor: 0.995625  
Current ATHD: 5.04071 (%)

### Photometric measurements:

Luminous Flux: 25157.72 (lumens)  
Luminous Efficacy: 136.3 (lumens/W)  
Correlated Color Temperature (CCT): 3979 (K)  
CRI -Ra: 83.408  
CRI -R9: 12.9074  
DUV: 0.0021  
CIE Coordinate (x): 0.383  
CIE Coordinate (y): 0.383  
CIE Coordinate (u'): 0.224  
CIE Coordinate (v'): 0.336  
TM30\_Rf: 83.0  
TM30\_Rg: 95.8  
TM30\_Rcs\_hue1: -11.13 %



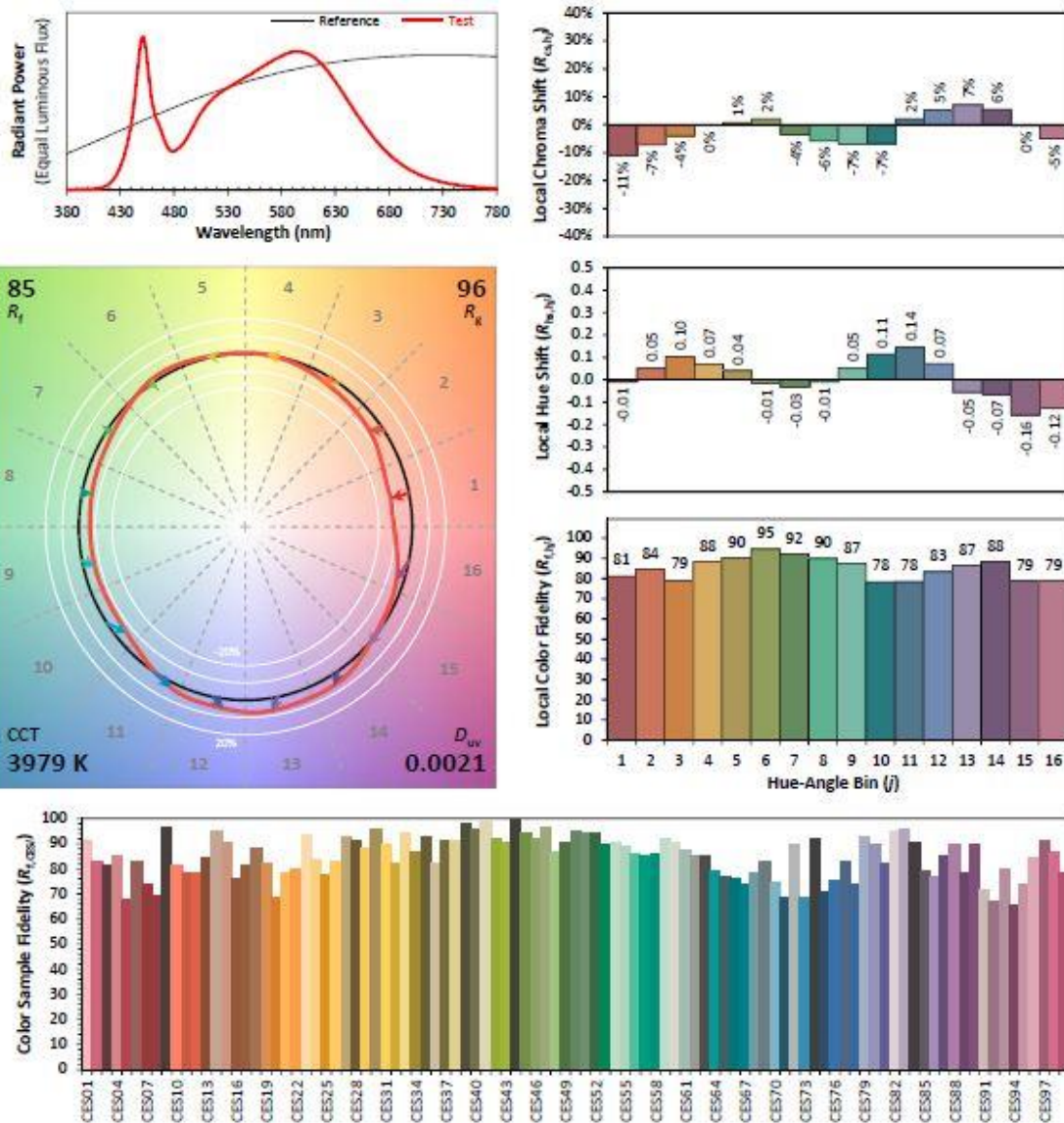
## Test Results: Integrating Sphere

Results continued from previous page.

### Tabulated Spectral Power in Visible Range:

| $\lambda(\text{nm})$ | $(\text{W/nm})$ | $\lambda(\text{nm})$ | $(\text{W/nm})$ | $\lambda(\text{nm})$ | $(\text{W/nm})$ | $\lambda(\text{nm})$ | $(\text{W/nm})$ |
|----------------------|-----------------|----------------------|-----------------|----------------------|-----------------|----------------------|-----------------|
| 350                  | 0.00041         | 490                  | 0.15026         | 630                  | 0.33474         | 770                  | 0.00724         |
| 355                  | 0.00045         | 495                  | 0.17804         | 635                  | 0.31020         | 775                  | 0.00625         |
| 360                  | 0.00055         | 500                  | 0.20872         | 640                  | 0.28476         | 780                  | 0.00537         |
| 365                  | 0.00080         | 505                  | 0.23692         | 645                  | 0.25963         | 785                  | 0.00465         |
| 370                  | 0.00100         | 510                  | 0.25994         | 650                  | 0.23433         | 790                  | 0.00399         |
| 375                  | 0.00139         | 515                  | 0.27830         | 655                  | 0.21001         | 795                  | 0.00345         |
| 380                  | 0.00190         | 520                  | 0.29253         | 660                  | 0.18714         | 800                  | 0.00299         |
| 385                  | 0.00241         | 525                  | 0.30484         | 665                  | 0.16555         |                      |                 |
| 390                  | 0.00274         | 530                  | 0.31478         | 670                  | 0.14546         |                      |                 |
| 395                  | 0.00294         | 535                  | 0.32497         | 675                  | 0.12741         |                      |                 |
| 400                  | 0.00320         | 540                  | 0.33464         | 680                  | 0.11125         |                      |                 |
| 405                  | 0.00394         | 545                  | 0.34467         | 685                  | 0.09639         |                      |                 |
| 410                  | 0.00594         | 550                  | 0.35442         | 690                  | 0.08358         |                      |                 |
| 415                  | 0.01082         | 555                  | 0.36490         | 695                  | 0.07218         |                      |                 |
| 420                  | 0.02103         | 560                  | 0.37510         | 700                  | 0.06220         |                      |                 |
| 425                  | 0.03996         | 565                  | 0.38512         | 705                  | 0.05348         |                      |                 |
| 430                  | 0.07274         | 570                  | 0.39520         | 710                  | 0.04595         |                      |                 |
| 435                  | 0.12380         | 575                  | 0.40499         | 715                  | 0.03932         |                      |                 |
| 440                  | 0.20114         | 580                  | 0.41285         | 720                  | 0.03384         |                      |                 |
| 445                  | 0.33268         | 585                  | 0.42000         | 725                  | 0.02901         |                      |                 |
| 450                  | 0.45632         | 590                  | 0.42520         | 730                  | 0.02483         |                      |                 |
| 455                  | 0.39894         | 595                  | 0.42649         | 735                  | 0.02125         |                      |                 |
| 460                  | 0.27012         | 600                  | 0.42443         | 740                  | 0.01813         |                      |                 |
| 465                  | 0.20877         | 605                  | 0.41893         | 745                  | 0.01556         |                      |                 |
| 470                  | 0.16524         | 610                  | 0.40946         | 750                  | 0.01335         |                      |                 |
| 475                  | 0.12897         | 615                  | 0.39550         | 755                  | 0.01146         |                      |                 |
| 480                  | 0.12106         | 620                  | 0.37843         | 760                  | 0.00983         |                      |                 |
| 485                  | 0.13165         | 625                  | 0.35771         | 765                  | 0.00840         |                      |                 |

## IES TM-30-18 Color Rendition Report



**Notes:** This is a recommended method for displaying ANSI/IES TM-30-18 information.

$x$  0.3829  
 $y$  0.3828  
 $u'$  0.2243  
 $v'$  0.5046

CIE 13.3-1995  
(CRI)

$R_a$  83  
 $R_g$  13

## Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L20088.

Dialight unit model number H[C,E,F,W][D,U]-[L,Z]EN-[2,8]Ex-xxx-xx

### Electrical Measurements:

Input Voltage: 120 (VAC)  
 Input current: 1.533 (A)  
 Input Power: 183.0 (W)  
 Power Factor: 0.9944

### Photometric measurements:

Absolute Luminous Flux: 24669 (lumens)  
 Luminous Efficacy: 134.8 (lumens/W)

### Intensity Summary:

#### Candlepower Summary

| H/V   | 0.00  | 45.00 | 90.00 | 135.00 | 180.00 | Lumens |
|-------|-------|-------|-------|--------|--------|--------|
| 0.00  | 14383 | 14385 | 14361 | 14343  | 14383  |        |
| 5.00  | 13820 | 14040 | 14314 | 14193  | 13909  | 1421   |
| 15.00 | 10858 | 12018 | 13843 | 12417  | 11061  | 3298   |
| 25.00 | 8216  | 9426  | 12832 | 9798   | 8419   | 4261   |
| 35.00 | 6278  | 7376  | 11414 | 7601   | 6462   | 4573   |
| 45.00 | 3356  | 5501  | 9630  | 5723   | 3458   | 3668   |
| 55.00 | 1016  | 2847  | 7422  | 3108   | 1034   | 2075   |
| 65.00 | 444   | 892   | 4955  | 971    | 452    | 1124   |
| 75.00 | 309   | 373   | 2229  | 384    | 315    | 601    |
| 85.00 | 250   | 241   | 459   | 244    | 251    | 214    |
| 90.00 | 233   | 218   | 259   | 218    | 237    |        |

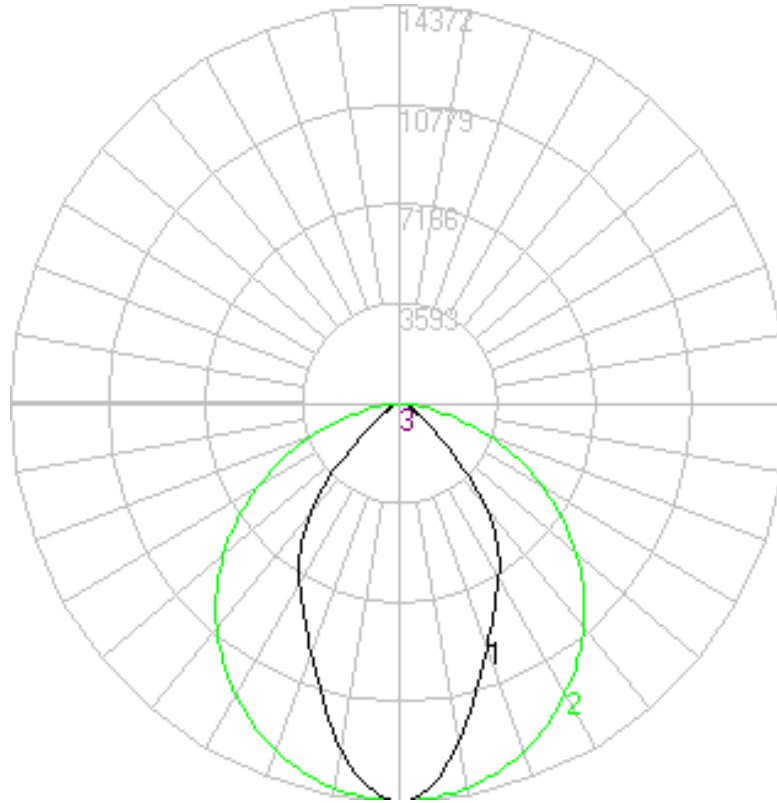
#### Zonal Lumen Summary

| Zone      | Lumens   | % Lamp | % Fixture |
|-----------|----------|--------|-----------|
| 0 to 30   | 9380.22  | 38.02  | 38.02     |
| 0 to 40   | 14421.54 | 58.46  | 58.46     |
| 0 to 60   | 21940.58 | 88.94  | 88.94     |
| 0 to 90   | 24669.72 | 100.00 | 100.00    |
| 90 to 180 | 0.00     | 0.00   | 0.00      |
| 0 to 180  | 24669.72 | 100.00 | 100.00    |

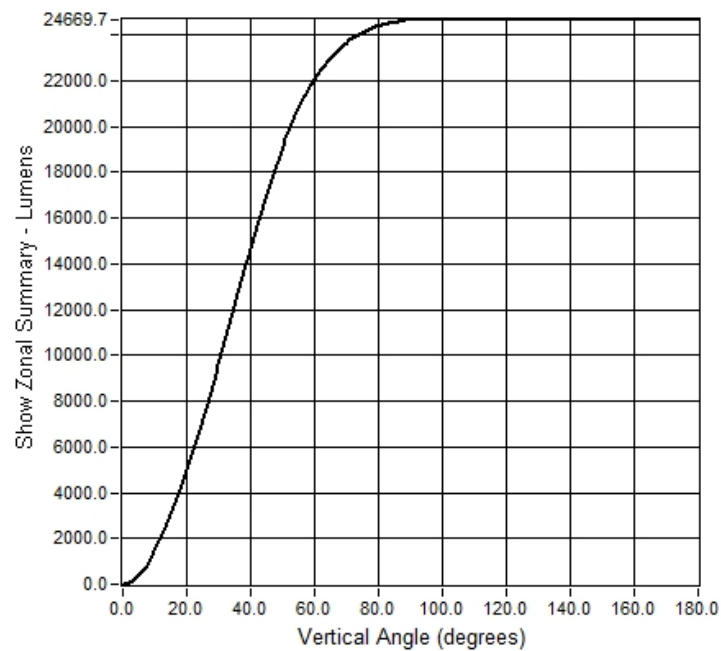
## Test Results: Goniometer

Results continued from previous page.

### Polar Plot:



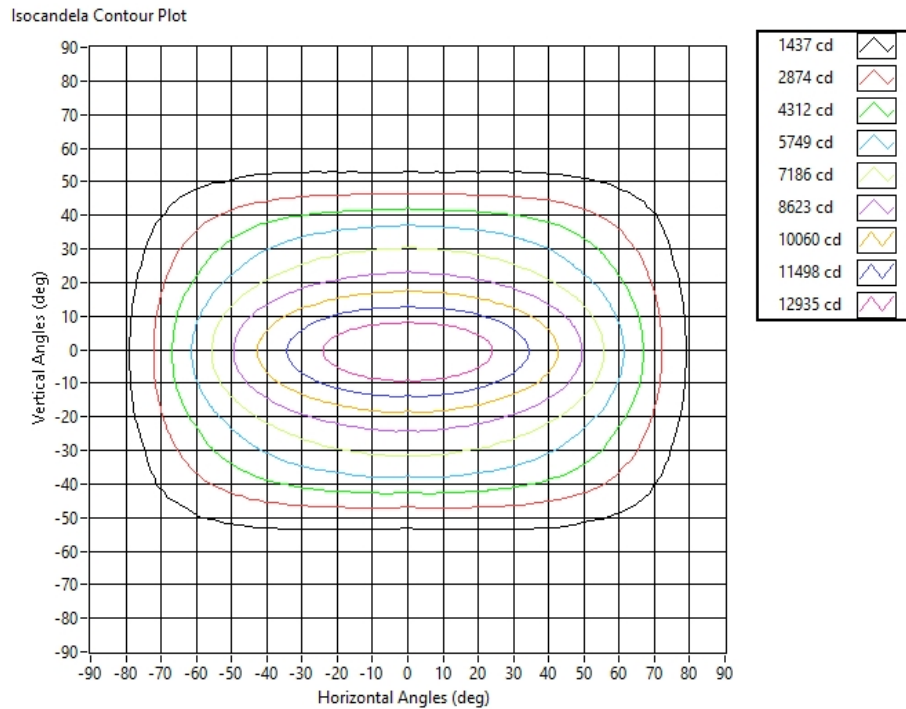
### Zonal Flux Graph



## Test Results: Goniometer

Results continued from previous page.

### Illuminance Plot:



### Illuminance-Cone of Light:

| Mounting Height (m) | Beam Cone Width (m) | Orthogonal Beam Cone | Projected Illuminance (lux) |
|---------------------|---------------------|----------------------|-----------------------------|
| 3.56168             | 7.89                | 333.60               | 20.0                        |
| 13.1234             | 15.77               | 83.40                | 20.0                        |
| 19.685              | 23.66               | 37.07                | 20.0                        |
| 26.2467             | 31.54               | 20.85                | 20.0                        |
| 32.8084             | 39.43               | 13.34                | 20.0                        |
| 39.3701             | 47.32               | 9.27                 | 20.0                        |
| 45.9318             | 55.20               | 6.81                 | 20.0                        |
| 52.4934             | 63.09               | 5.21                 | 20.0                        |
| 59.0551             | 70.97               | 4.12                 | 20.0                        |
| 65.6168             | 78.86               | 3.34                 | 20.0                        |

## Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L20088.

Dialight unit model number H[C,E,F,W][D,U]-[L,Z]EN-[2,8]Ex-xxx-xx

LED identified as Seoul Semi part number SAW8C22B.

LED drive current (as indicated by customer): 47 (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:

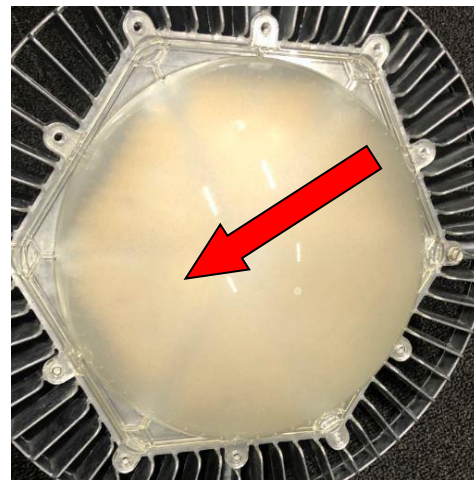
|                                     |       |      |
|-------------------------------------|-------|------|
| Maximum Power at Indicated Current: | 0.282 | (W)  |
| Maximum Source Temperature:         | 120.2 | (°C) |

### Test Conditions:

|                                             |                       |
|---------------------------------------------|-----------------------|
| Temperature Measurement Location:           | See Photographs Below |
| Ambient Temperature:                        | 25° ± 5° (°C)         |
| Ambient temperature at time of measurement: | 23.9 (°C)             |
| Relative humidity at time of measurement:   | 35%                   |

### Results:

**Measured LED source temperature:** 59.6 (°C)



#### Equipment Used:

| Equipment Name                                        | Model Number        |
|-------------------------------------------------------|---------------------|
| Omega TC                                              | DPI8                |
| YOKOGAWA Digital Power Meter                          | 11/26/3981          |
| LSI High Speed Mirror Goniometer                      | 6240T               |
| Elgar AC Power Supply                                 | CW1251P             |
| Sorensen DC Power Supply                              | XHR150-7            |
| Dialight Confirmation Sample                          | HB1N4N              |
| Dialight Confirmation Sample                          | HB1N4J              |
| Fluke 8808A Digit Multimeter                          | 8808A               |
| Step-Up Transformer                                   |                     |
| ITL Osram Calibraton lamps for Goniometer             | J9a8                |
| ITL Osram Calibraton lamps for Goniometer             | J9a8                |
| ITL Osram Calibraton lamps for Goniometer             | J9a8                |
| Fluke 971 Humidity Meter                              | 8/28/1902           |
| GwINSTEK DC Power Supply                              | GEP172679           |
| Dialight Confirmation Sample                          | 1/0/1900            |
| Labsphere calibration lamp for 2M sphere              | SCL-1400            |
| Labshere 2M sphere                                    | Illumia Plus 2600-1 |
| Labshere Controller                                   | PM-150-140          |
| Labshere Spectrameter- CDS 2600 Spectrometer          | CDS-2600            |
| Xitron Power Analyzer                                 | 9/1/1907            |
| LED Bulb for Electrical Confirmation Test-Gold Sample | Monte Carlo         |
| LED Bulb for Electrical Confirmation Test-Gold Sample | Monte Carlo         |
| LED Bulb for Electrical Confirmation Test-Gold Sample | Monte Carlo         |
|                                                       |                     |
|                                                       |                     |

#### 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.

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#### 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